UNIVERSITY OF TORONTO



REPORT OF THE DEAN OF THE

FACULTY OF MEDICINE

Session 1965-1966

THE DEAN OF THE FACULTY OF MEDICINE

In the annual reports of 1963-64 and 1964-65, the general plan of the future development of the Faculty was discussed. This year it is a pleasure to report that

implementation has begun.

Work on the site for the new medical building is now under way. The building will contain approximately 650,000 square feet gross, and will extend from King's College Road east to Queen's Park Crescent, replacing the School of Practical Science, the Biology building and, finally, the Medical building. An enormous structure designed to conform to the average height of buildings around the campus, its mass has been broken into three components with the largest bordering Queen's Park. The appearance of the campus will be greatly changed, but in the opinion of many of my colleagues it will be a change for the better as the buildings being replaced are without distinction. The architects' drawings of the new building promise that the south end of the campus will be dominated by no mean edifice.

In function, the building will be truly a health sciences centre for the University, providing education in the basic medical sciences to students in Arts and Science, Medicine, Dentistry, Pharmacy, Nursing, Food Sciences and Physical and Health

Education.

Progress in relation to expansion of teaching and research facilities in hospitals has not been as rapid because the problem is more complicated. Service to the community is the prime function of the hospital whether it be a teaching hospital or not, but when teaching is part of the function of such a hospital, the range and character of service provided to patients is greatly extended. The clinician who is attracted to the teaching hospital is one with an inquiring mind that continually seeks and probes to find out what is causing disease. He wants and demands facilities to do research and the time to do it. The hospital without both the experimental and the diagnostic laboratories that are so necessary to clinical research cannot retain its top flight clinical scientists. They move to the hospital that will encourage and support investigation and the kind of medical care that results from it, for there is no doubt that the quality of medical care is directly related to research. The inquiring mind of the clinical scientist is directed beyond his immediate laboratory studies to improvement in medical care of the patient and ultimately the prevention of his disease. Almost equal in importance to the provision of research facilities is gaining the time of the clinical scientist to use them. This can only be achieved through relieving him of the necessity of earning all his income through the private practice of medicine. It is a pleasure to report that this latter fact has been recognized by the University, and during the past year a 40 per cent increase in budget was provided, almost all for academic salaries and principally in clinical departments.

The addition of research to the function of a hospital, and the kind of staff that undertakes it, usually and in fact always result in pressures to create special diagnostic and treatment services, because the hospital becomes a referral centre not only for the immediate community but for a much wider geographic area. In most of our major teaching hospitals, approximately 30 per cent of the patients come from outside the city of Toronto. The quality of the medical staff is the key to the teaching hospital, not only in attracting patients, but in teaching at every level, including medical undergraduates, career training of medical specialists, continuing education of practising physicians, research training of clinical scientists and education of a host of paramedical professions. Although the extent and degree of involvement in research and teaching of each teaching hospital in this centre varies, in

each and every one they are of primary concern.

In planning the future development of a teaching hospital, then, provision of research and teaching areas must be considered in the light of services for medical

care of patients. Today this is no simple matter. The pattern of medical practice and care in the community is changing, with the general hospital providing more and more care of the kind formerly given by the general practitioner, this being imposed upon the specialized referral hospital and increasing its dimension of service to that of a health centre.

In the opinion of the members of the clinical departments, this trend towards provision of comprehensive medical care will be enhanced through the introduction of subsidized health insurance, necessitating the development of a new policy for the operation of the emergency and outpatient departments that will recognize the changing role of the hospital in the community. Ambulatory care departments or centres must be created to give treatment for twenty-four hours per day, staffed preferably by practitioners primarily concerned with family practice. Such centres will become of major importance in teaching medical undergraduates.

I hope that this brief account of the teaching hospital and its expanding role in the community will explain in part the tremendous task that is faced in planning

at this time.

It is important to define the role of the teaching hospital in the community because pressures are being exerted by the medical profession at large to restrict and limit the activities and therefore the functions of the teaching hospital. What needs to be emphasized is that the changing role of the hospital is a response to the demands of the community, and not of the medical staff of the hospital.

Two events of importance occurred during the past academic session, both

assuring the orderly development of health sciences education in Ontario.

To co-ordinate planning of health services and education, the Province of Ontario has established a Senior Co-ordinating Committee under the chairmanship of the Deputy Minister of Health, Dr. K. C. Charron, with the Deputy Minister of University Affairs, Mr. J. McCarthy, and the Chairman of the Ontario Hospital Services Commission, Mr. Stanley Martin, as members. The deans of medicine have formed a committee, under the aegis of the presidents of provincially assisted universities of Ontario, which is co-operating with the governmental committee, and in addition making progress in resolving common problems. This deans' committee must play a major role in assisting the governmental Senior Committee in planning health education facilities that anticipate the pattern of medical care of the future.

The support given by government to the development of the medical schools and their teaching hospitals has made it very clear that Ontario can and should have the best medical schools in Canada, provided the staff can be trained and recruited. It is therefore a pleasure to report that the University of Toronto has successfully begun to recruit the increased staff needed to meet its expanding commitments to teaching and research. For the next academic session, 60 new full-time positions have been filled. The greatest problem at present is space, but through the energetic co-operation of Mr. Stone and Mr. Hastie temporary accommodation is being found.

The primary teaching hospitals of the University of Toronto, the Toronto General Hospital, St. Michael's Hospital and the Toronto Western Hospital, are now deeply involved in completing plans that will help each to meet the challenge of becoming what will be, in fact, one of several clinical schools. In addition, Sunny-brook Hospital has just been acquired by the University for a teaching hospital. These plans not only envisage the changing role of the major hospitals in providing adequate research and teaching space, but also the changing service needs of the

community.

Of the affiliated hospitals all are planning modernization or expansion, and are including major commitments to research. The Wellesley Hospital will open in 1966 its new wing incorporating research laboratories. The Women's College Hospital has completed plans and is now ready to begin new construction. The New Mount Sinai Hospital has gained approval of its tentative planning, as has the Princess Margaret Hospital. Lyndhurst Lodge is planning to move to a new site immediately

south of Sunnybrook, an area that will contain in close proximity major rehabilitation facilities. Already in that location are the Canadian National Institute for the Blind, the Crippled Children's Centre and the Toronto Rehabilitation Centre.

With expansion of research and other facilities, the necessity of co-operation between the various teaching hospitals has become very evident if duplication is to be avoided. The meeting of a joint committee of the Dean and Chairmen of the Boards of Trustees of the teaching hospitals two years ago has paved the way for the establishment of a permanent committee that must in time deal with hard problems of allocation of space and facilities.

Parallel to the planning of space and facilities has been the further development of the curriculum, this past year under two committees, one basic science and one clinical with cross representation. Much progress has been made in clarifying the integrated course in normal function to be given during the first 18 months. The second phase of the curriculum to be given in the clinical setting has been slower

in forming because it is, I believe, more complex.

Present indications are, however, that closer integration of all aspects of the latter half of the course is inevitable. The full implications have not yet been foreseen of the announcement by the College of Physicians and Surgeons of Ontario that the compulsory internship need not be a rotation through all services of a general hospital. This, coupled with the recent notice from the Ontario Hospital Services Commission that medical students may be paid as summer interns, paves the way for radical changes in the duration of the school year as well as the curriculum.

The Admissions Committee has continued to render outstanding service to the Faculty at the sacrifice of much time of its members. In the academic session commencing September 1, 1965, 138 students were admitted to first year premedicine, and 165 to first year medicine. Of this latter group, 101 were admitted after completing the premedical course and 64 after obtaining a degree in the Faculty of Arts and Science of the University of Toronto or in some other recognized university. Once again there were many more qualified students applying for the premedical course than could be accepted. How many of those not accepted are lost to medicine it is impossible to determine, although many gain admission to the first medical year after completing a degree course. It should be stated once more that few qualified and acceptable students fail to gain admission to the first professional year, if not at this University then at another Ontario university.

Professor J. W. Steiner, who succeeded Dr. Spaulding as Associate Dean, Student Affairs, has undertaken a study of the criteria for admission of students together with long-term follow-up of their subsequent course and career. This is already proving extremely valuable to the Admissions Committee. These studies are part of a broader programme of investigation into education in health sciences, with particular reference to medicine, which is now sponsored by a grant-in-aid from

the Commonwealth Foundation.

A major event towards the close of the academic session was the opening of the Clarke Institute, the successor to the Toronto Psychiatric Hospital and new home of the Department of Psychiatry. It has beds for 200 patients, excellent lecture rooms, and research facilities. The occasion of the academic opening was marked by a series of lectures given by distinguished visitors, and the conferring of an honorary degree on Sir Aubrey Lewis.

Staff

During the past academic session there were numerous changes in staff and in

particular in department heads.

In the Department of Anatomy, Professor A. W. Ham resigned as Chairman and is succeeded by Professor J. S. Thompson. Professor J. A. Dauphinee resigned as Chairman of the Department of Pathological Chemistry and is succeeded by Professor A. Gornall. Professor E. A. Sellers resigned as Chairman of the Department of Pharmacology to become full time Associate Dean, Basic Sciences. He is succeeded

by Professor W. Kalow as Chairman of the Department, but will continue to hold a professorship in Pharmacology and to assist with teaching. Professors Ham and

Dauphinee will also continue as Professors in their respective departments.

Professor R. W. Gunton has resigned as Chairman of the Department of Therapeutics to become head of the Department of Medicine at the University of Western Ontario. No successor to Dr. Gunton has been appointed, as it is debatable whether or not Therapeutics should continue as an independent department rather than as an integral part or at most a division of the Department of Medicine.

Professor F. G. Kergin has relinquished the headship of the Department of Surgery to be Associate Dean, Sunnybrook Hospital. He is succeeded by Professor W. R. Drucker, formerly of the Department of Surgery, Western Reserve University. In the Department of Otolaryngology, Professor P. E. Ireland has retired and is succeeded by Dr. D. Bryce. At the time of writing, the chairmanship of the Department of Paediatrics and also that of the Department of Psychiatry are unfilled. Professor A. L. Chute has been appointed Dean of the Faculty of Medicine, and Professor Aldwyn Stokes has relinquished his administrative duties in order to devote his time to teaching and research.

During the last two years, twelve, or two-thirds of the departmental chairmen have either retired or requested to be relieved of their administrative responsibilities

in order to devote more time to teaching and research.

It is with deep regret that I report the deaths of Professor Carl Aberhart of the Department of Surgery; Professor R. C. Ower of the Department of Anatomy; Dr. R. I. Harris, formerly head of orthopaedics in the Department of Surgery; Dr. C. A. Rae, formerly of the Department of Otolaryngology and latterly Chief Consultant to the Department of Veterans Affairs; and the Dean Emeritus of the Faculty of Medicine, Dr. J. A. MacFarlane.

At the end of this year, the following members of staff will have retired: Dr. D. B. French, Associate Professor and Dr. Hawthorne Steele, Clinical Teacher in the Department of Otolaryngology; Dr. C. E. Snelling as Professor in the Department of Paediatrics; Dr. A. W. Farmer as Professor, Dr. R. C. Laird as Professor, Dr. W. K. Welsh as Professor and Dr. D. R. Mitchell as Associate Professor in the

Department of Surgery.

I would like at this time to express on behalf of the Faculty our best wishes to the retiring members of staff. Without the part-time staff, this medical school could never have achieved the status it has. Their devotion to teaching has contributed more to the Faculty than is realized.

Resignations

It is with regret that I record the resignation of Dr. John R. Evans to become Dean of Medicine at McMaster University. Joining him in this exciting venture are Dr. W. B. Spaulding and Dr. J. F. Mustard. On behalf of the Faculty, I wish them every success.

Dr. Jessie Gray and Dr. Geraldine Maloney have both resigned, as heads of Surgery and of Obstetrics and Gynaecology respectively, in the Women's College Hospital. Both of them made major contributions to the development of their specialties in the University.

Dr. J. W. Bilbey of the Department of Anatomy has left the University to

enter general practice in British Columbia.

Resignations were also received from Dr. K. Gal of the Department of Pathology and from Dr. W. G. B. Casselman of the Department of Pharmacology.

Research

In the report of each department there is an account of research during the past year. In all departments the expansion of the research activity is evident. So much of the vitality of the school depends upon the continued growth of research that its importance cannot be overstated. Without the help of the granting agencies

this essential function could not be carried out. On behalf of the Faculty it is a privilege to express our deepest gratitude to the following during the past year: Alcoholism and Drug Addiction Foundation; Alpha Gamma Delta Founders Memorial Foundation; American Medical Association; The Atkinson Charitable Foundation; Banting Research Foundation; J. P. Bickell Foundation; Canadian Arthritis and Rheumatism Society; Canadian Diabetic Association; Canadian Heart Foundation; Canadian Life Insurance Officers Association; The Commonwealth Fund; The Connaught Medical Research Laboratories; The James H. Cummings Foundation; The Defence Research Board; Department of Health (Provincial); Department of National Health and Welfare; James Franceschini Foundation; John and Mary Markle Foundation; Medical Research Council; Multiple Sclerosis Society; Muscular Dystrophy Association of Canada; R. Samuel McLaughlin Foundation; National Cancer Institute; National Council of Hebrew Women; National Research Council; National Sanitarium Association; Ontario Cancer Treatment and Research Foundation; Ontario Heart Foundation; Ontario Mental Health Foundation; Ontario Society for Crippled Children; Ontario Tuberculosis Association (Ontario Thoracic Society); Rehabilitation Fund for the Disabled; United States Army Medical Research & Development Command; United States National Institutes of Health.

Honours

Dr. C. M. Godfrey was elected a Councillor of the Academy of Medicine, Vice-President of the Canadian Association of Physical Medicine and Rehabilitation, and Curator and Chairman of the History of Medicine Museum, Academy of Medicine. Dr. J. S. Crawford was appointed Consultant in Physical Medicine to the Ontario Division, Canadian Arthritis and Rheumatism Society. Dr. Iain MacKay was invested by the Governor-General of Canada with the Order of St. John, in the rank of Serving Brother. Dr. J. W. A. Duckworth received the Canadian Forces Decoration. Dr. A. W. Ham received an honorary degree, Doctor of Science, from the University of Western Ontario. Miss M. MacKay had a drypoint engraving accepted in the 50th Annual Exhibition of the Society of Canadian Painter-Etchers and Engravers.

Dr. H. E. Johns was awarded the Charles Mickle Fellowship. Dr. R. Wilson was granted a Schering Travel Award. Dr. D. E. Cannell was elected Vice-President of the American Gynecological Society. Dr. C. W. Dobson was Chairman of the Section of Otolaryngology of the Academy of Medicine. Dr. Gosta F. Dohlman was elected a member of the American Laryngological Society, and received the George Shambaugh Prize at the annual meeting of the Collegium Otolaryngologicum in Tokyo. Dr. Blair Fearon was elected President of the American Broncho-Oesophagological Association. Dr. P. E. Ireland was guest of honour at a special lecture of the Royal Society of Medicine in London and presented a paper on the "Preparation of Man for Travel into Space." He also was invited as the North American representative to give the after-dinner speech at the International Committee banquet of the VIIIth International Congress of Oto-Rhino-Laryngology in Tokyo. Dr. Walter H. Johnson was elected a member of the Space Medicine Branch of the Aerospace Medical Association, and was Chairman of a symposium on vestibular problems in space travel held by the National Aeronautical and Space Administration at Palo Alto, California.

Dr. A. G. Gornall was elected to Fellowship in the Royal Society of Canada. Dr. C. H. Best received the Honorary Doctor of Medicine of the Free University of West Berlin, and the Bell of Peace of the Free City of Berlin. Dr. A. Sirek was awarded the Centennial Hoechst Medal in Frankfurt/Main. Dr. O. V. Sirek was also awarded the Centennial Hoechst Medal. Dr. A. C. Ritchie was elected Vice-President of the Canadian Association of Pathologists. Dr. J. U. Balis was awarded the Carveth Prize of the Canadian Association of Pathologists. Mrs. M. C. Crookston was elected President of the Ontario Antibody Club. Dr. N. B. Rewcastle was

Canadian representative at the International Congress of Neuropathology. Dr. R. Lindenfield was Chairman of the National Committee of the Canadian Association of Social Workers on Professional Competence. Dr. J. W. Mohr was President, Ontario Association of Corrections and Criminology; Dr. C. A. Roberts delivered the first Clarence Meredith Hincks Memorial Lecture at the University of Ottawa. Dr. R. B. Holmes was elected Vice-President of the Radiological Society of North America. Dr. K. F. MacEwen was made a Fellow of the American College of Radiography. Dr. F. G. Kergin was elected President of the American Association for Thoracic Surgery. Dr. W. G. Bigelow was elected Vice-President of the International Cardiovascular Society, and was appointed to the Council of the American Association for Thoracic Surgery and to the Defence Research Board. Dr. R. B. Salter was Visiting Professor of Orthopaedic Surgery to the Universities of Melbourne, Adelaide, Sydney, Brisbane, Perth and Auckland. Dr. R. W. Jackson was appointed a Markle Foundation Scholar. Dr. G. F. Pennal was elected President of the

Canadian Orthopaedic Association.

Dr. A. Alison was Honorary President, Medical Women's Undergraduate Association. Dr. H. J. M. Barnett was Vice-President and official Canadian delegate to the Pan American Neurological Congress and Honorary Secretary-Treasurer of the Medical Society and the Canadian Neurological Society. Dr. D. S. Beanlands was appointed Medical Director of the Royal Life Saving Society of Canada. Dr. D. E. Bergsagel was appointed Visiting Professor of Medicine to the National Cancer Institute, National Institutes of Health, Bethesda, Maryland. Dr. I. Broder was made a Fellow of the American Academy of Allergy. Dr. A. Bruce-Robertson was Secretary-Treasurer of the Clinical Research Society. Dr. W. T. W. Clarke was elected to the American Society of Artificial Internal Organs. Dr. J. S. Crawford was Chairman of the Medical Advisory Board, Toronto Rehabilitation Centre. Dr. J. H. Crookston was a member of the Managing Board, International Committee for Standardization in Haematology. Dr. J. Digby was appointed Director of Professional Education, Ontario Branch, Canadian Arthritis and Rheumatism Society. Dr. R. Hasselback was elected to membership in the American Society of Haematology, was a member of the Council of the Ontario Antibody Club, a member of the Planning Committee for "A Toronto Institute for Training in Medical Technology," and Secretary of the Haematology Section, Ontario Medical Association. Dr. J. G. Humphrey was Chairman, Section of Neurological Sciences, Academy of Medicine. Dr. A. J. Kerwin was a Fellow on the Council on Clinical Cardiology of the American Heart Association. Dr. O. S. Kofman was elected a Fellow of the American College of Physicians.

Dr. J. C. Laidlaw was elected representative of Health Sciences to the President's Council. Dr. D. C. H. Ley was made a Fellow of the American College of Physicians. Dr. J. A. Little was appointed to the Scientific Advisory Committee on Atherosclerosis of the Ontario Heart Foundation, and served as a Councillor in the Clinical Research Society of Toronto. He was elected President of the Toronto Diabetes Society. Dr. R. Ian Macdonald was elected President of the College of Physicians and Surgeons of Ontario. Dr. E. A. McCulloch became Associate Editor, Journal of Cellular Physiology. Dr. D. P. Murnaghan was made a Fellow of the American College of Cardiology, and served on the Clinical Council of Cardiology of the American Heart Association. Dr. J. F. Paterson attended the International Tuberculosis Conference in Munich. Dr. J. M. Rae was appointed a member of the Ad Hoc Committee for Revision of the Medical Act re Ailing Physicians. Dr. H. A. Smythe was made a member of the National Board of Directors, Canadian Arthritis and Rheumatism Society. Dr. P. G. Walfish was elected Vice-President, Clinical Research Society of Toronto. Dr. J. R. Wherrett received a Ph.D. degree from the University of London. Dr. K. J. R. Wightman was Visiting Professor, Montreal General Hospital. He delivered the John Stewart Lecture at Dalhousie University. He was President of the Canadian Association of Gastroenterology and

served on the Board of Trustees of the Nightingale School of Nursing. Dr. C. R. Woolf served on the executive of the Ontario Thoracic Society and was Chairman of the Gas Club, Toronto.

Visitors

During the academic session many prominent physicians and scientists visited

the Faculty. These included:

Department of Anaesthesia: Professor John Nunn of the University of Leeds, England who gave the seventh Dr. Harry Shields Lecture; Professor W. J. Watt, Auckland, New Zealand; Dr. William Pallister, London, England; Dr. R. W. Cope, London, England; Dr. James Parkhouse, Oxford University; Professor H. B. Graves, University of British Columbia; Professor E. A. Gain, University of Alberta; Dr. Richard Jenkins, Cardiff, Wales; Professor Gordon Wyant, University of Saskat-

chewan; Professor O. Thomas, Lagos, Nigeria.

Department of Medicine: Dr. D. E. Christian, Kingston, Jamaica; Professor R. R. A. Coombs, Cambridge, England; Dr. James Crooks, Aberdeen, Scotland; Dr. J. N. Cumings, London, England; Dr. Anatole Dekaban, Washington; Dr. E. R. Giblett, Seattle, Washington; Professor J. P. Hoet, Louvain, Belgium; Dr. L. Horlick, Saskatoon; Professor J. D. Hunter, Dunedin, New Zealand; Dr. B. W. Johannson, Sweden; Dr. J. R. Drevans, Baltimore, Maryland; Professor S. M. Misra, Bhopal, India; Professor P. L. Mollison, London, England; Dr. Salvator Pahua, Mexico City; Dr. Graeme Sloman, Melbourne, Australia.

Department of Obstetrics and Gynaecology: Professor T. N. A. Jeffcoate, Uni-

versity of Liverpool, and Professor G. B. Maughan of McGill University.

Department of Ophthalmology: Dr. Richard Troutman, New York University, Dr. Angus McLean and Dr. M. E. Langham of Johns Hopkins University; Dr. L. E. Zimmerman of Washington who gave the Walter W. Wright Lecture; Professor Paul Weinstein, Budapest; Professor Henry Allen, Harvard University; and Mr. J. Winstanley, London, England.

Department of Otolaryngology: Professor Shambaugh, Northwestern University,

and Professor Work, University of Michigan.

Department of Pathology: Dr. V. Marinozzi, Villejuif; Dr. G. Weissmann, New York University; Professor E. Benditt, University of Washington; Dr. C. O. Carter, London, England; Dr. V. Dubowitz, New York; Dr. E. A. Murphy, Johns Hopkins University; Professor D. L. Wilhelm, University of New South Wales; Dr. D. McGregor, Western Reserve University; and Dr. G. B. Pierce, University of Michigan.

In the Division of Neuropathology: Dr. J. N. Cumming and Dr. P. Gautier-

Smith, National Hospital, London.

Department of Physiology: Dr. Y. Takaoka, Japan; Dr. J. P. Hoet, Belgium; Dr. P. R. Bouman, the Netherlands; Dr. S. P. Bessman, Maryland; and Dr. I. G.

Jarrett, Adelaide, Australia.

Department of Psychiatry: Dr. H. C. Haywood, Peabody College, Tennessee; Dr. P. H. Connell, London, England; Dr. A. M. Marcus, Vancouver; Dr. N. D. Tabachnick, Los Angeles; Dr. N. B. Epstein, Montreal; Dr. B. Townsend, Essex, England; Dr. J. Klauber, London, England; Dr. P. V. Lemkau, Baltimore; Dr. F. P. Fish, Liverpool; and Dr. S. Wolf, Oklahoma.

Department of Radiology: Professor R. H. Morgan, Johns Hopkins University; Professor S. M. Rogoff, University of Rochester; Professor E. D. B. Neuhauser,

Harvard University; and Dr. R. Marshak, New York.

Division of Postgraduate Medical Education: Professor Cyril Keele, Department

of Pharmacology, Middlesex Hospital, London, England.

Department of Biochemistry: Dr. R. G. Spiro, Harvard Medical School; Dr. Q. Gibson, Cornell University; Dr. B. Vennesland, University of Chicago; Dr. Morris Kates, National Research Council, Ottawa; Dr. L. Smillie, University of

Alberta; Dr. L. Berlinguet, Laval University, Quebec; and Dr. E. W. Abrahamson,

Case Institute of Technology, Cleveland, Ohio.

Throughout the time that I have been Dean, the support and co-operation of the heads of the departments and divisions has been outstanding, and has brought the Faculty through a very difficult period of planning and re-appraisal. To each and every one of them I am deeply indebted. The staff of the Dean's office has served the Faculty loyally and well, and I am sincerely grateful for all the generous help they have given me during the past five years.

JOHN HAMILTON

DIVISION OF POSTGRADUATE MEDICAL EDUCATION

Under the direction of Professor R. Ian Macdonald

During the 1965–1966 session 1,674 students were registered with the Division. Of these 1,241 were doctors in active practice who attended one or more of the twenty-three refresher courses organized to meet the needs of different groups. In addition, the advanced graduate courses in Medicine, Surgery and Obstetrics and Gynaecology were given over a six-week period in August and September. These courses were attended by 74 students from different parts of Canada and a few from abroad. The amount of faculty teaching time devoted to the advanced graduate courses and to the short refresher courses in a variety of subjects in medicine was substantial. Each department bearing the responsibility for planning a course kept in mind the particular needs of colleagues in active practice. Twelve out of the twenty-three courses offered were designed primarily for doctors in family practice and some of the specialist courses proved to be of interest to these practitioners as well. Courses such as the Eye Surgery Clinical Meeting, the Tenth Annual Course in Radioactive Isotopes, the Otolaryngology Clinical Meeting and the course in Cardiology attracted doctors from all across the country. The Ninth Annual Refresher Course in Public Health offered by the School of Hygiene proved to be of wide interest and attracted students from a wide area.

Four hundred and thirty-three of those registered were graduate students working and studying full time in clinical and basic science departments. Fourteen were enrolled in part-time (summer) courses proceeding to the B.Sc. (Med.) degree. These students attended the course in Radioactive Isotopes required as part of their summer course. Ninety-three of the students were registered in diploma courses, 44 in sessional courses and 296 as internes, residents and fellows.

The Decentralized Clinic programme now in its fifteenth year sent seventeen teams of university teachers to five centres in Ontario. This is believed to be one of the most useful postgraduate teaching activities for it provides opportunities for doctors to take an active part in continuing education in their home area using their own patients as teaching texts. At the same time it brings university teachers into contact with medical problems and practice in different areas of the Province.

DIVISION OF REHABILITATION MEDICINE

Under the direction of Professor A. T. Jousse

The department continues to discharge its teaching responsibilities to physical and occupational therapists and medical students at the undergraduate level, to physicians and speech therapists and prospective teachers of physical and occupa-

tional therapy at the postgraduate level, and, through the Division of Postgraduate Medical Education, to practising physicians and surgeons and physical therapists by means of short refresher courses.

The total number involved is considerable as is shown below:

GRADUATE

Training of Physiatrists	4
Speech Pathology and Audiology	13
Teacher's course in Physiotherapy	3
Course in Medical Manipulation	70
Rehabilitation course for Nurses	30

Undergraduate

Medical students	
Third year	134
Fourth year	157
Physical and Occupational Therapy	260

During July and August of 1965 the second summer speech clinic and seminar was held on the campus. As in the previous year, this endeavour was made possible by financial support from the Atkinson Foundation. It provided once more a much-needed diagnostic and clinical service for a number of children suffering from speech defects.

Numerous changes of staff are taking place this year.

In speech pathology we lose the valued services of Miss C. Renfrew and Miss J. Cooper, both of whom are returning to posts in Britain, having given us two years of excellent teaching and stimulating contact.

The teaching staff in physical therapy suffers the loss of Miss Joan Walker who has accepted a teaching post at the University of Witwatersrand in South Africa. Miss Walker has become a much respected and esteemed member of the teaching staff in the three years she has spent here.

As well we lose Miss M. Harland from our roster of staff, although our students will continue to benefit from her wisdom and experience as she transfers from the Division of Rehabilitation Medicine to the Department of Anatomy where she will devote her full time to that department and its requirements.

Mrs. Patricia Pearce will also leave to devote her time to private practice in physical therapy.

We are fortunate in being able to welcome back Mr. A. Helewa as a replacement for one of those who are leaving.

New building plans require that our present building be demolished in the near future, thus necessitating a move to temporary quarters. This move will require some adaptability on the part of both staff and students.

SCHOLARLY ADDRESSES

In December 1965, Dr. C. M. Godfrey was invited to address the Intermissionary Annual Meeting at Ambo, Ethiopia.

Dr. A. T. Jousse was invited to attend the Third International Congress of Neurological Surgery at Copenhagen, Denmark in August, 1965. The title of his address was "Farly Management of Trayma to the Spinal Cord."

address was "Early Management of Trauma to the Spinal Cord."

Dr. J. S. Crawford attended the First Caribbean Congress of Physical Medicine and Rehabilitation in April, 1966. He presented a paper entitled "Spinal Osteomyelitis as it presents to the Physiatrist."

RESEARCH

In the Orthotic Department of this Division, which is located at the Wellesley Hospital, a programme has been initiated to further the development of externally

powered ortheses. Patients have been fitted on a trial basis with carbon dioxide and

electrically powered appliances.

Several lightweight appliances have been produced for rheumatoid patients. A standard series of adaptations have been developed for use in kitchen utensils whereby prevention of deformity is achieved for adult female patients. This work is carried on with the Rheumatic Diseases Unit of the Wellesley Hospital.

In the facial prosthetic unit, operated jointly by this Division and the Ontario Cancer Treatment and Research Foundation, two trainees are being taught the manufacture and fitting of facial prostheses. One of the trainees is an ear, nose and

throat surgeon from the Philippine Islands.

The study of the natural history of speech disorders in school children continues

in co-operation with the Toronto Board of Education.

At Lyndhurst Lodge a study was made of the infecting organisms found in the urine of paraplegic patients and of the influence of any form of treatment on the survival of these organisms. A report will soon be published.

Publications

GODFREY, C. M. "Control of Patient Transfer" (Canadian Hospital Journal, vol. 43, no. 5, June, 1966, p. 81).
"The Devil's Due—Fees" (Applied Therapeutics, vol. 7, Oct., 1965, pp. 889-902). "Dr. John Rolph" (Bulletin of the Academy of Medicine, vol. 35, no. 5, 1965,
pp. 80-3).
——— "The Earliest Prosthesis?" (ibid., vol. 39, no. 6, March, 1966, pp. 96-7).
"The History of Medicine Museum, Academy of Medicine" (Ontario Medical Review,
Dec., 1965, pp. 38-42). "A Physician's Tour of the Peoples' Republic of China" (Medical Graduate, vol. 11,
no. 3, 1965, pp. 2-4).
"Speech and Hearing Rehabilitation Program in Canada" (Proceedings of the Third
Pan-Pacific Rehabilitation Conference, Tokyo, Japan, April, 1965, pp. 324-5).
"The Toronto Rehabilitation Forearm Cane" (Journal of the Canadian Physiotherapy
Association, vol. 17, no. 4, Dec., 1965, pp. 241-2).
"The Wellesley Frame" (Canadian Hospital, vol. 43, no. 3, 1966, p. 63).
"World Alumni" (Medical Graduate, vol. 12, no. 2, spring, 1966, pp. 8-9).
GODFREY, C. M., BRADBURY, J. and Jousse, A. T. "A Long Leg Walking Caliper with
Functional Knee Joint' (Archives of Physical Medicine and Rehabilitation, vol. 46, Oct.,
1965, pp. 712-13). GODFREY, C. M. and SMYTHE, H. A. "A Hand Program for Rheumatoid Patients" (film,
colour, 16 mm., with sound, 18 minutes). Rehabilitation Series No. 5.

MEDICAL SOCIETY

(September 1965 to June 1966)

Honorary Pr	rest	ide	nt	•					•		•	Dean John D. Hamilton
Honorary Se	cre	etai	ry-'.	Tre	asi	irer	•	•		•		Dr. H. J. M. Barnett
Chairman	•			•		•						Dr. Robert Galway
												Peter Culbert
Vice-Preside	nt					•			•	•		Stuart MacLeod
Treasurer										•	•	Marvin Stein
												Kathy Chambers

The 1965-66 session of the Medical Society Assembly was noteworthy as a year of achievement and of reviewing of problems facing the Society. The attainment of both objectives was made possible through the leadership and interest of Dean Hamilton, Dr. J. W. Steiner (Associate Dean, Student Affairs), and Dr. Robert Galway, the Assembly's Chairman.

During the course of the year the executive pondered at length the means whereby the Assembly's operation could be made more effective and efficient. Decisions in this regard resulted in a new approach whereby the executive would

assume greater responsibility for routine business, thus freeing society meetings for the discussion of more topical and controversial matters. It was hoped that this would also encourage greater student participation in Medical Society affairs. A decision was also made to hold the Society elections in early February so that the new Assembly might have ample time to familiarize itself with the function and procedures of the Society before the end of the academic year.

Through the industrious efforts of treasurer Marvin Stein a detailed analysis of the Society's financial position was undertaken in an attempt to alleviate a serious shortage of funds. The conscientious co-operation of the Assembly members resulted

in balanced books which even showed a small profit.

The year's activities traditionally commenced with the Freshman dinner in Hart House. An excellent turnout of prominent clinicians complemented the skilful handling of the arrangements by the Public Relations Officer, Brian Hands. Following the dinner the usual dance was held, but for the first time, this year, at Varsity Arena. Approximately 2,000 students attended and it is believed that this was the

largest dance of its kind ever sponsored by a single faculty or college.

The Thanksgiving conference of the national executive of the Canadian Association of Medical Students and Internes saw Toronto assume its full responsibilities in policy making, in a continuing attempt to make the Camsi organization meaningful to all Canadian medical students. During this conference a signal honour was received by the *University of Toronto Medical Journal* when it was awarded the Charles E. Frosst Trophy for the outstanding undergraduate medical journal in Canada. The excellence of this journal has been continued this year by co-editors Sandy Logan and Stan Bernstein.

It has been gratifying to note that two proposals passed at the fall convention of Camsi were implemented during the course of the year. The first was the winter weekend held in Ottawa by the Ontario Division of Camsi. At that gathering, Toronto was well represented in the clinical pathological conference competition by Bill Nelems and Norm Kee of the graduating year. The second was the inauguration of the Camsi Summer School in tropical medicine to be held in August in Haiti. Five delegates were chosen to represent Toronto. They will join approximately 50 other students from across Canada for the three-week school in the Caribbean.

The Society was most fortunate this year in having Stuart MacLeod as its very capable vice-president. As a result of his talent for organization both the Fall Dance at Hart House and the annual Meds At-Home at Casa Loma were resounding financial and social successes.

No less successful was Daffydil '65 under the chairmanship of Howard Kidman. Medsmen could be justly proud of this year's unique and humorous combination of

song and spice.

The Assembly was again privileged this year to be the guest of the Dean at a dinner held in Hart House. During the informal discussions the Assembly heard first hand about the new medical sciences building complex and the proposed

changes in the curriculum.

Highlighting the second half of the academic year was the expanded version of the Staff-Student Smoker. This year's ambitious programme, designed to acquaint students and staff with the implications of proposed medicare legislation, was divided into two sessions occupying an afternoon and evening. The afternoon portion was held in Convocation Hall for all students in the Faculty and consisted of a dialogue between two eminently qualified authorities on the subject: Dr. J. Madden, Professor of Economics, Guelph University and Economic Adviser to the Hall Royal Commission, and Dr. V. C. Goldbloom, Chairman of the Economic Policy Committee of the Canadian Medical Association. Questions from the floor followed the formal presentations.

The evening session was designed to inform staff and students of government policy in the field of health care. The evening participants, speaking in the King Edward Hotel, were the Honourable A. J. MacEachen, Minister of National Health

and Welfare; the Honourable M. B. Dymond, Minister of Health; Dr. R. O. Jones, President of the Canadian Medical Association, and Professor B. R. Blishen, Economic Adviser to the Hall Commission. The chairman of the panel was Dr. A. Thomas, Director of the Canadian Association for Adult Education.

Judging by the attendance and keen interest shown during both sessions the

project was undoubtedly a beneficial venture for all concerned.

The Assembly was pleased to note a tremendous upsurge of interest and enthusiasm in the Staff-Student Committee this year. Rejuvenated under Dr. Steiner and Michael Robinette, considerable progress was made in preparing student critiques and promoting understanding between students and staff concerning questions of medical education. The work of the Committee was greatly enhanced through the day-long discussions held at the Guild Inn involving fifteen members of the staff and fifteen students.

In the sphere of literary activities the Society again had a successful year. The Meds debating team won the newly presented Joseph McCulley Trophy for intramural debating. This was achieved under the direction of John Dawson, chairman of the Arts and Letters Society and through the accomplished debating of David Posen, Michael Schwartz and Bill Cass.

The *Probe* magazine, revitalized this year, provided an excellent outlet for creative literary and artistic talents. Published twice during the year by Messrs. Wagner, Czarnecki and Picton the *Probe* justified its existence in the Faculty both financially and as a successful literary venture.

The Osler Society enjoyed an interesting programme during the year which

included an informal evening with the controversial Dr. Morton Shulman.

Representing the Faculty in campus student affairs, Vladimir Hachinski and Bill Cass on the SAC, Allan Gordon and David Kendal on the Blue and White Society, and John Carlisle on WUS all carried out their duties with distinction.

Special commendation must go to year presidents Michael Baker (IV); Paul Manley (III); Don Prior (II); Marvin Waxman (I); Greg Haber (II Premed.); Michael Smith (I Premed.); Warden of the Duncan Room, Ron Baigrie; M.W.U.A. President, Helen Gryniewski; Senior Camsi Officer, Bill Weiss; and Secretary, Kathy Chambers, for their unselfish and enthusiastic dedication.

The Medical Society Assembly, on behalf of the students in the Faculty of Medicine, was honoured to be able to present a small token of their appreciation to Dean Hamilton for his years of service to the Medical Society as well as to the

individual students.

PETER S. CULBERT

MEDICAL ATHLETIC ASSOCIATION

(September 1965 to June 1966)

Honorary Preside Honorary Secreta	nt		•	•		•				•	Dr. F. P. Dewar
Honorary Secreta	ry-I	Tre	asu	rer		•	•			•	Bill Carrothers
President	•						•				I. Sinclair
Vice-President.						•				•	G. Barber
Secretary-Treasur	er	•		•		•			•		D. Mather
Publicity Director	•			•					•		J. Maki
Quartermaster.	•	•	•	•	•	•	•	•	•	•	R. Walker
YEAR REPRESENT											
IV Medical Year											W. Angell
III Medical Year				•		•		•			P. Loftus
II Medical Year											
I Medical Year											

II Premedical Year P. Kent
I Premedical Year R. Townsend

The 1965-66 M.A.A. Executive undertook a general reorganization of the M.A.A., hoping that this might retard, if not reverse, the apathetic trend which seems to have entered its ranks in the past two years. It was the feeling of the executive that there was a lack of continuity from one year to the next. Hence, to ensure against this, the executive was reorganized so that the president would be elected from the third medical year along with the Secretary-Treasurer, and the Vice-President would be elected from the second medical year. From the fourth medical year would come the Past-President. Next year, Mr. Barber, last year's Vice-President, will be the Past-President. Aside from providing much needed continuity this change will add an extra position of experience to the executive, and will remove the greater part of the responsibility from the shoulders of a fourth-year medical student who may find it very difficult to be available.

Because of the continually changing state of interfaculty competition the executive felt the athletic point system, the basis on which athletic awards are obtained, was badly outdated. The system was thus changed to a much more acceptable form in keeping with the present state of interfaculty competition. Subsequently, Mr.

Paul Kent diligently up-dated all the point cards of all medical students.

Because of the loss of some uniforms through failure of students to return them, a \$5.00 deposit was made compulsory for anyone borrowing M.A.A. equipment. On the return of the equipment the deposit was returned. This has worked out very well.

In interfaculty competition this year we had one of our leaner years. Swimming and water polo provided us with our only championships, thanks mainly to our third medical year. Although we may not have a particularly enviable won-lost record, it is encouraging to note that we had but one default throughout the year. This speaks for itself in so far as the enjoyment derived by the participants in the M.A.A. and interfaculty athletic programmes. Our first soccer team, first lacrosse team, first rugger team, volleyball team, second hockey team, second and third squash teams, first, second and third year water polo teams and first and second basketball teams were all finalists in their respective divisions. Mr. Paul Kent distinguished himself by being a finalist in the interfaculty tennis competition.

The annual golf day held in the early fall was successful with some 70 golfers competing for various prizes. The event was highlighted by a banquet at which Dean

Hamilton presided and Dr. John Evans was the guest speaker.

Another, now annual, outing was the ski day, held at Georgian Peaks in early February. We had an excellent day with some 120 skiers taking advantage of the

beautiful weather and banquet held at the end of the day.

The awards banquet was held in mid-March with the Dean representing the Faculty, and the Honorary President, Dr. Ted Dewar, and the Honorary Secretary, Bill Carrothers, as speakers. 22 medical M's were awarded along with 3 athletic mugs. Dave Carll won the Tom Boeschenstein Award. Bill Carrothers gave an excellent and thought-provoking address on international competition as opposed to recreational sport.

I should like to thank this year's executive for their co-operation and industry. I wish Bryce Taylor and his in-coming executive success both on the field of play and in their encouragement of more active medical participation in interfaculty

competition.

IAN SINCLAIR

MEDICAL WOMEN'S UNDERGRADUATE ASSOCIATION

(September 1965 to June 1966)

The year 1965-66 was a year of change for the M.W.U.A. The executive

structure, altered in May 1965, was designed to improve efficiency.

The steady increase of members in the Medical Women's Undergraduate Association has gradually resulted in a loss of the close bonds between various years and within each class. In the past few years it had become evident that changes in both the number and the type of functions sponsored by the Medical Women's Undergraduate Association were necessary if the purpose of this organization was to be achieved. There were fewer events this year but it was gratifying to find them very well attended and thoroughly enjoyed by both the students and the graduates in the Medical Women's Federation.

For the first time the Medical Women's Undergraduate Association and the Federation of the Medical Women of Canada-Ontario Branch, held a combined initiation banquet in Burton Hall on November 1. After the initiation ceremony, Dr. Maureen Roberts of Ottawa, the National President of the Federation of Medical Women of Canada, spoke on her recent expedition to Easter Island.

Although the Christmas gifts for the University Settlement House had to be contributed even earlier this year—by the end of November—the annual Christmas party for our members was held December 7 and the Christmas carols were enjoyed

by all.

The Medical Alumni was host at a very informative evening. Following a buffet supper, Dr. Marjorie Moore led a discussion on the timely and controversial topic of Family Planning.

The Federation of Medical Women of Canada honoured the graduating class

at a dinner and theatre party in the spring.

I should like to express my sincere appreciation to the executive for their untiring efforts to make this a successful year and I would like also to thank Dr. Ruth Alison for her active participation and unfailing support of our programme.

HELEN N. GRYNIEWSKI

MEDICAL WOMEN'S ATHLETIC ASSOCIATION

(September 1965 to June 1966)

President.........Gail PontingVice-President.........Mary Ellen McCollSecretary.........Karen CroninTreasurer.........Pat BlachfordI Premed Rep..........Violet Shadd

In the academic year 1965–66 the women of the Faculty of Medicine participated actively in the athletic programme sponsored by the Women's Athletic Association (WAA) of the University of Toronto. The Medical Women's Athletic Association (MWAA) is responsible for encouraging and organizing entries into each sport in an effort to provide an opportunity for competition and exercise, and

to nurture in its women a sense of sportsmanship and fellowship within and without the Faculty.

The MWAA sent representatives to all of the clubs, each of which oversees a particular interfaculty sport, e.g. the badminton club, although there were no participants from Medicine in many of the indivdual sports. Gail Ponting represented

the Faculty on the newly constituted Directorate of the WAA.

In the fall the Meds basketball team did very well until the quarter-finals of the interfaculty playoffs when it was defeated in a very close game. We were pleased to have Shirley Hunter (II Premed) and Violet Shadd (I Premed) selected to the intercollegiate basketball team which won the intercollegiate championship this season.

This winter our ice hockey team was moved into the "A" league in view of our highly successful past few seasons. Unfortunately we were not quite up to the standard of the other teams in this league and consequently suffered many defeats. It is hoped that we will profit from the experience gained and possibly be playoff contenders next year. The team's highest scorer for several seasons in a row, Patti Gair, was once again chosen for the intercollegiate hockey team which also won an inter-

collegiate title.

Our annual athletic banquet at the Nanking restaurant marked the official close of the athletic season and provided opportunity for the presentation of athletic awards. The WAA awarded one of its highest honours, the Silver Tray, to Patti Gair of IV Meds for her outstanding performance in intercollegiate and interfaculty athletics throughout her undergraduate years; Shirley Hunter and Violet Shadd received Intercollegiate T's; Karen Cronin, Mary Ellen McColl, and Gail Ponting (all of II Meds) earned Interfaculty T's. Medical M's were awarded to Karen Cronin, Mary Ellen McColl and Gail Ponting by the MWAA. To climax a very successful evening Dr. Harry Ebbs addressed the guests and showed slides of his recent round-the-world trip, including many points of medical and athletic interest.

In the coming year the MWAA executive intends to strive for increased support to interfaculty athletics, especially in the area of individual sports, in the hope of

further enriching the university experience of the women of the Faculty.

BIOLOGICAL AND MEDICAL DIVISION UNIVERSITY LIBRARY

Reported by Mrs. M. Galt

Once again we are greatly indebted to the teaching staff for their continued interest and valuable co-operation. As a result of their numerous recommendations, 156 new serial titles and a very considerable number of new monographs were added

to collection this year.

The Special Committee on Medical Science Bibliography Services in Canada visited the Library in November. The Committee consists of: Dr. J. B. Firstbrook (Chairman), Associate Dean, Faculty of Medicine, Queen's University; Dr. R. K. Smiley, Assistant Dean, Faculty of Medicine, University of Ottawa; Mr. B. Peel, Chief Librarian, University of Alberta; Miss A. Kerr, Librarian, Faculty of Medicine, University of Manitoba. The Committee's terms of reference call for a critical appraisal of two major proposals of the Simon Report and appropriate recommendations for their implementation. The two points under consideration are: (1) that a National Medical Bibliographic Centre and Information Service be established in the very near future; (2) that the library with which the National Medical Bibliographic Centre is associated be developed as the main "reservoir library" for Canada. Their report, soon to be presented to the A.C.M.C., should be of considerable significance to all aspects of medical research in Canada.

REPORT ON REGISTRATION, SESSIC	ON 1966–1967
First Premedical Year	134
Second Premedical Year	157
Second Medical Year	
Third Medical Year	182
Fourth Medical Year	7
Bachelor of Science (Medicine)	4
Bachelor of Science (Medicine) Summer Session (also registered in medical undergraduate years)	14
Diploma in Medical Radiology	31
Diploma in Psychiatry	30
Diploma in Industrial Health	
Diploma in Anaesthesia Graduate Students Physical and Occupational Therapy	280
Physical and Occupational Therapy	282
Speech Pathology and Audiology	4
	1,616
FELLOWSHIPS, SCHOLARSHIPS, MEDAI	LS AND PRIZES
Awarded at Convocation, 1966	
GRADUATE	
Ursula E. Bangs I.O.D.E. Scholarship	M. H. King, M.D., B.Sc. (Med.)
Graham Campbell Prize	G. P. Dohlman, M.D.
Canadian National Institute for the	
Blind Fellowships	R. M. Gladstone, M.D. P. D. Chubb, M.D.
	C. L. Kemp, B.A., M.Sc., Ph.D.
	C. R. Woolf, B.Sc., M.B., Ch.B.,
Dr. Arthur F. Haasz Fellowship	M.D., M.R.C.P., F.R.C.P.(C) L. M. Jerry, M.D.
Stuart Alan Hoffman Memorial Prize	C. C. Liew, B.Sc., M.A.
<u> </u>	J. E. Harris, M.D. R. Beaudry, M.D.
	J. V. Teodoro, M.D.
Alexander McPhedran Research Fellowship	H. C. Palter, M.D.
	G. P. Brawley, M.D. B. A. Britt, M.D., Dip. Anaes.
Starr Medal	J. C. Kennedy, B.A., M.D.
Edward Christie Stevens Fellowship	
John Alexander Stewart Fellowships	D. R. Wilson, M.D., F.R.C.P. (C)
	R. A. Hart, M.D
Undergraduate	
Fourth Medical Year	
Cody Gold Medal	Miss J. J. E. Turley K. W. Johnston
	G. J. Douglas
Dr. Benjamin W. Appleton Prize in Psychiatry	Miss D. E. Levy
	N. G. Kee A. P. Scholtz
	Mrs. Z. M. Davison
Chappell Prize in Clinical Medicine	Miss J. J. E. Turley
	Miss J. J. E. Turley K. W. Johnston
Issei Scholarship in Medicine and Surgery	Miss S. J. Pierce
	A. P. Scholtz P. S. Culbert
Medical Alumni Association Scholarship	G. J. Douglas
Ellen Mickle Fellowship	K. W. Johnston
Ontario Medical Association Prize in Preventive Medicine	Miss J. J. E. Turlev
Preventive Medicine	Miss J. J. E. Turley
Starkman Memorial Scholarship in Medicine	K. W. Johnston

Third Medical Year

J. F. Hartz Company Prize in Ophthalmology J. F. Hartz Company Prize in Oto-Laryngology Frank W. Horner Gold Medal Dr. Mitchell Kohan Scholarship Dr. Thomas Arnold McCormick Scholarship Dr. and Mrs. M. A. Pollock Award Saddington Medal in Pathology Starkman Memorial Prize in Pharmacology and Therapeutics	K. P. H. Pritzker P. M. Richardson R. C. Strickler M. B. Buckspan R. I. Hilliard S. Berger S. Berger M. Bach
Starkman Memorial Scholarship in Preventive Medicine	J. M. Colman L. Grossman
Walter F. Watkins Scholarship (extra award)	M. Bach
Second Medical Year	
Posluns Brothers Scholarship	G. R. French B. R. Taylor B. N. French W. A. Dymon A. D. Tepperman H. Vellend
First Medical Year	
Starkman Memorial Scholarship in Anatomy Dr. C. S. Wainwright Memorial Scholarship Dr. C. S. Wainwright Memorial Scholarship	
(extra award)	
Second Premedical Year	
Famous Players Canadian Corporation Scholarship. Fulford Scholarship (No. 4 General Hospital).	

ANAESTHESIA

Under the direction of Professor R. A. Gordon

The development of the academic programme of the Department continues to be handicapped by the inadequacy of space and facilities, but the active planning which has gone on during the past year for the development of improved facilities, particularly at the hospital level, and the projected improvement in support for aca-

demic staff has significantly improved the morale of the Department.

The teaching of undergraduate students in the third and fourth years has continued in the pattern established during the previous session. Emphasis in the undergraduate course is placed on resuscitation, maintenance of the airway, ventilation and general care of the unconscious patient. Each fourth year student is attached for one week during the surgical term to an instructor who acts as preceptor, and is expected to accompany him in his daily work. As before, the fourth year students have been given a series of weekly two-hour clinics during the surgical term, and have been required to show elementary proficiency in certain technical procedures essential to the contemporary general physician.

There were 47 postgraduate students in the Department during the year, 32 of

whom were registered in the Diploma Course, the remainder being sessional students. In addition 2 general practitioner anaesthetists and 1 Colombo Plan student received periods of training in the Department varying from four to six months. The number of appointments available for residents and fellows in the teaching hospitals has been increased during the year. This will improve the position of the Department in relation to the growing demand for training in the specialty of anaesthesia, and will improve the standard of the postgraduate teaching in the Department by reducing the load of service responsibility required of each student.

The present structure and content of the postgraduate tutorial courses is cur-

rently under review.

The Diploma in Anaesthesia of the University of Toronto was awarded to Dr. K. Bhavakula, Dr. Silva Hogg, Dr. W. A. James, Dr. Michael Krestow, Dr. J. R.

Vanderburgh, and Dr. R. K. Weber.

The Department gave a one-week refresher course in November 1965 for general practitioners with a special interest and experience in anaesthesia. A four-day course in the treatment of respiratory insufficiency was given during the same month in co-operation with the Departments of Medicine, Surgery and Otolaryngology. Members of the Department have contributed to a number of postgraduate courses in other departments of the Faculty.

The seventh Dr. Harry Shields Lecture was given on December 10, 1965, by Professor John Nunn of the University of Leeds. Professor Nunn's subject was "The

Lungs as a Black Box."

The Department has been pleased to welcome a number of distinguished visitors during the year, amongst them the following: Professor W. J. Watt, Auckland, New Zealand; Dr. William Pallister, London, England; Dr. R. W. Cope, Great Ormond Street Hospital, London, England; Professor John Nunn, University of Leeds; Dr. James Parkhouse, Oxford University, England; Professor H. B. Graves, University of British Columbia; Professor E. A. Gain, University of Alberta; Dr. Richard Jenkins, Welsh National School of Medicine, Cardiff; Professor Gordon Wyant, University of Saskatchewan; Professor Orishejolomi Thomas, University of Lagos Medical School, Lagos, Nigeria.

Professor Llewellyn Thomas of the Department of Pharmacology has been appointed an Associate in the Department of Anaesthesia. Dr. John Desmond, Dr. Sallie Teasdale, and Dr. W. R. Lorimer joined the Department as Clinical Assistants

in July 1965.

Dr. Shirley Fleming has continued for a fourth year as Professor and Head of the Department of Anaesthesia of the University of Lagos Medical School in Nigeria. Dr. Warren Squire, a postgraduate student from this Department, has spent the year as Registrar in the Department in Lagos. The Department continues to sponsor a programme of assistance to the Lagos School, with the financial assistance of the Educational Division of the External Aid Office of the Government of Canada.

Professor R. A. Gordon again visited the University of Lagos Medical School in February 1966. During his visit he lectured to the undergraduate students, and took part in seminars at the undergraduate and postgraduate level. Professor Gordon was Visiting Professor in the Department of Anaesthesia at McGill University for one week during the month of April 1966, and also attended an International Conference on Neurophysiology in Relation to Anesthesiology in Seattle during the month of May, and the Annual Meeting of the Heads of the Departments of Anaesthesia of Canadian Universities in Banff, Alberta on June 5th.

Professor H. B. Fairley was the Annual Visitor of the Australian and New Zealand Societies of Anaesthetists during October and November 1965. Dr. Fairley gave lectures and demonstrations in each of the Australian states, and was the distinguished guest at the annual meetings of the Australian and of the New Zealand Societies of Anaesthetists. On his way to Australia Professor Fairley visited Departments of Anaesthesia in Singapore and Bangkok. Professor Fairley was also Visiting

Professor, Baltimore City Hospitals in February 1966.

Dr. Iain MacKay has been appointed Chairman of the Metropolitan Toronto Hospital Council Committee on Disaster Planning, and has also been appointed to represent the Canadian Medical Association on the Emergency Health Services special Advisory Committee to the Minister of National Health and Welfare. Dr. MacKay has also been appointed to the Council of the Defence Medical Association of Canada and is a delegate to the Conference of Defence Associations of Canada.

SCHOLARLY ADDRESSES

The following scholarly addresses were given by the members of the Depart-

ment during the year.

Professor H. B. Fairley gave addresses in the medical schools in Singapore; Perth, Western Australia; Melbourne, Victoria; Hobart, Tasmania; Sydney, New South Wales at Sydney University and the University of New South Wales; Brisbane; and at Dunedin in New Zealand, and at hospitals in Adelaide, South Australia; Ballarat, Victoria; Auckland, Christchurch, Palmerston North, and Hamilton in New Zealand. The subject of these addresses were "The Oxygen Tightrope," "Physiology and Management of Chest Wall Injuries," "The Mechanical Ventilator," "Negative Phase—Helpful or Harmful?" "Monitoring Intermittent Positive Pressure Ventilation," "The Respiratory Intensive Care Unit," "Post-operative Respiratory Failure," and "Facilities for Hyperbaric Oxygen Therapy." At Baltimore City Hospitals February 1966, "Physiology and Management of Chest Wall Injuries" and "The Management of Respiratory Failure Secondary to Chronic Pulmonary Disease"; at the Essex County Medical Society, September 1965, "The Organization of Facilities for Respiratory Intensive Care"; to Scarborough Hospital Medical Staff, April 1966, "Facilities for Respiratory Intensive Care"; at the annual meeting, Ontario Medical Association, May 1966, "Factors Influencing Post-operative Oxygen Tension"; at the annual meeting, Canadian Anaesthetists' Society, June 1966 "Effect of Hyperventilation on Arterial Oxygen Tension."

Dr. Donald C. Finlayson to the Section of Anaesthesia of the Ontario Medical Association in Ottawa, October 1965, "Water and Sodium Balance in Surgical Patients"; at the annual meeting of the Ontario Medical Association, May 1966, "Pharmacology and the Use of Mannitol" and to the Gynecological Travellers (Great Britain) in Toronto, "The Use of Peritoneal Dialysis in the Management of

Peritonitis."

Dr. A. E. Johnston to the Dalhousie University Postgraduate Course in Anaesthesia, September 1965, "Hazards in Paediatric Anaesthesia," and to the Symposium on "Anaesthesia and the Infant" at the Hospital for Sick Children, Toronto in November 1965, "Tracheo-oesophageal fistula."

Dr. James H. Kerr on "Common Hazards in Anaesthesia" to the North Peel

Medical Society in February 1966.

Professor R. A. Gordon on "Current Concepts of the Aetiology and Treatment of Shock" to the South Peel Clinical Society in March 1966. Dr. I. M. MacKay on "Modern Methods of Anaesthesia" to the Medical Staff Association of Dufferin County in October 1965. Dr. D. A. Pelton on "Omphalocele" at the Symposium on Anaesthesia and the Infant, The Hospital for Sick Children, November 1965. Dr. I. A. Sloan on "Anaesthesia for the Total Correction of the Transposition of the Great Vessels" to the Austrian-German-Swiss Societies of Anaesthesia, September 1965; "Developments in Paediatric Cardiac Anaesthesia" to the University of Newcastle and United Newcastle-upon-Tyne Hospitals, Newcastle-upon-Tyne, England, October 1965; "Aspects of Pre- and Post-Operative Care of the Cardiac Child" and "Scope, Design and Staff of a Recovery Ward" to the Association of Anaesthetists of Great Britain and Ireland in October 1965; "Prolonged Ventilation and Nasotracheal Intubation" to the New York State Society of Anesthesiologists, in May 1966; "Another Technique for Tonsillectomy in Children" to the Canadian Anaesthetists' Society annual meeting, June 1966.

RESEARCH

Professor Fairley with the assistance of Dr. Gordon Sellery has carried out an evaluation of the Bird Mark 7 Ventilator with respect to the performance of the injector system. Professor Fairley and Dr. Sellery are undertaking a survey of the incidence and extent of arterial hypoxaemia in the immediate post-operative period and a study of the effects of variations in anaesthetic technique on post-operative hypoxaemia. Professor Fairley has made a theoretical analysis of the changes occurring in arterial oxygen tension secondary to changes in ventilation, cardiac output and physiological shunt, and is proceeding with a project aimed at validation of the theoretical predictions under clinical circumstances. This work has been supported in part by a grant from the Medical Research Council, and Dr. Sellery has been supported in part by the Burroughs Wellcome Award for Research in Anaesthesia.

At St. Michael's Hospital, Dr. D. C. Finlayson has studied changes in red cell mass and plasma volume associated with spinal anaesthesia and with transurethral resection of the prostate carried out under spinal anaesthesia. Dr. Finlayson has also initiated a study of the changes in sodium balance associated with the use of infusions of mixed electrolytes in surgery involving the gall bladder.

At the Toronto Western Hospital, Professor Boyes and Dr. David Evans have undertaken to study the clinical value of a portable nerve stimulator in assessing the

effect of muscle-relaxing drugs.

At the Toronto General Hospital Dr. James Kerr has completed his investigations on the effect of smoking on airway resistance, and on the effect of epidural anaesthesia on broncho-pulmonary resistance. The results of these investigations are currently being prepared for publication. Dr. Kerr has continued his investigations of the effect of pregnancy upon the pulmonary component of the work of breathing. Dr. Kerr's work has been supported in part by a grant from the Medical Research Council of Canada.

Dr. I. M. MacKay has continued his interest in the clinical appraisal of emergency anaesthetic apparatus and of apparatus designed for the use with halothane and methoxyflurane. Dr. B. M. Marshall and Dr. J. H. Moran are continuing their study of neuroleptic drugs in anaesthesia. Dr. John Desmond is studying changes in blood electrolytes and the fragility of red blood cells associated with superhydration occurring during transurethral resection of the prostate.

Publications

BLENKARN, G. D. and FAIRLEY, H. B. "The Accuracy of Two Simplified Versions of the Haldane Apparatus in the Hands of Inexperienced Residents" (Canadian Anaesthetists' Society Journal, vol. 13, no. 2, March, 1966, pp. 176-8).

Society Journal, vol. 13, no. 2, March, 1966, pp. 176-8).
CREIGHTON, R. E., WHALEN, J. D. and CONN, A. W. "The Management of Congenital Diaphragmatic Hernia" (Canadian Anaesthetists' Society Journal, vol. 13, no. 2, March,

1966, pp. 124–9).

Evans, D. and Boyes, H. W. "Experiences with a Portable Peripheral Nerve Stimulator" (Canadian Anaesthetists' Society Journal, vol. 13, no. 3, May, 1966, pp. 300-2).

FAIRLEY, H. B. "The Oxygen Tightrope" (Canadian Anaesthetists' Society Journal, vol. 13,

no. 2, March, 1966, pp. 98-108).

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FLEMING, S. A. (with Bearcroft, W. G. C.). "The Effect of Repeated Administration of Halothane on the Livers of Healthy Monkeys" (Canadian Anaesthetists' Society Journal, vol. 13, no. 3, May, 1966, pp. 247-51).

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Intravenous Lignocaine" (Canadian Anaesthetists' Society Journal, vol. 13, no. 1, Jan., 1966, pp. 21–7).

GORDON, R. A. "Pre-operative Assessment and Post-operative Care of the Surgical Patient"

(West African Medical Journal, vol. 25, no. 1, Feb., 1966, p. 608).
GORDON, R. A. and MORAN, J. H. "Studies of Pentazocine (WIN-20228): I, Evaluation as an Analgesic in Post-Operative Patients" (Canadian Anaesthetists' Society Journal, vol. 12, no. 4, July, 1965, pp. 331-6).

HUNTER, M. E. and GORDON, R. A. "Laboratory and Clinical Studies of 2-Phenylalanine-8-Lysine Vasopressin (Octapressin)" (Canadian Anaesthetists' Society Journal, vol. 13,

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JOHNSTON, A. E. and CONN, A. W. "The Anaesthetic Management of Tracheo-oesophageal Fistula: A Review of Five Years Experience" (Canadian Anaesthetists' Society Journal, vol. 13, no. 1, Jan., 1966, pp. 28-39).

MORAN, J. H. and MARSHALL, B. M. "A Report on Clinical Uses of Droperidol and Fentanyl" (Canadian Anaesthetists' Society Journal, vol. 13, no. 3, May, 1966, pp. 272-81).

Pelton, D. A. and Conn, A. W. (with Urbanowicz, N. N. and Bond, F. O.). "A New Concept of Humidification" (Canadian Anaesthetists' Society Journal, vol. 13, no. 2, March, 1966, pp. 172–5).

SHAPLEY, J. M. "Methods of Grounding Operating Room Equipment" (Journal of the Association of Hospital Engineers and Maintenance in Canada, vol. 2, no. 1, Feb., 1966,

SLOAN, J. A. "Aspects of Pre- and Post-operative Care of the Cardiac Child" (Anaesthesia,

vol. 21, no. 1, Jan., 1966, pp. 103-7).

Te, Leonard T. and Conn, A. W. "Effect of Adrenergic Beta-Receptor Blocker on Epinephrine-induced Cardiac Arrhythmias during Halothane Anaesthesia" (Canadian Anaesthetists' Society Journal, vol. 13, no. 3, May, 1966, pp. 242-6).
Young, W. E. (with McClenahan, J. B. and Sykes, M. K.). "Respiratory Changes after Open Heart Surgery" (Thorax, vol. 20, no. 6, Nov., 1965, pp. 545-54).

ANATOMY

Under the direction of Professor A. W. Ham

Undergraduate Teaching

The staff are required to conduct not only extensive courses for the large class of medical students (which must be divided into two sections for laboratory work) but many other courses that are adapted to the special levels and areas of anatomical knowledge required by large groups of students in other schools or faculties. For example, last year separate courses were given to different groups and numbers of students as follows:

GROSS ANATOMY							
First Medical Year students				•	•		165
Second Year Biology and Medicine students							28
Third Year Biology and Medicine students							3 5
Speech Pathology and Audiology students	•				•		8
Second Year Physical and Health Education students		•	•	•	•		85
Third Year Physical and Health Education students	•		•	•	•		61
First Year Dental students							126
First Year Dental Hygiene students	•	•	•	•	٠	٠	50
First Year Rehabilitation Medicine students							110
Second Year Rehabilitation Medicine students							85
Third Year Rehabilitation Medicine students							96
Art as Applied to Medicine students							2
Rehabilitation Medicine Teachers' Course student.	•	•	•	٠	٠	٠	1
HISTOLOGY							
First Year Medical students							165
Third Year Biology and Medicine students							
Art as Applied to Medicine students							2
First Year Rehabilitation Medicine students							110
Neuroanatomy							
Second Year Medical students							170
Second Year Art as Applied to Medicine students.	•	•		•	•		2
become Teal fift as Applied to Medicine students.	•	•		•	•		_

GRADUATE AND POSTGRADUATE TEACHING

Graduate Teaching

Students registered in the School of Graduate Studies were enrolled in the following courses given by this Department:

Gross Anatomy					4
Growth Constitution and Evolution				•	10
Gross Anatomy for Graduate Dental students					17
Histology					8

Postgraduate Teaching

Courses were given to:

Dental Anatomy students.		•								•			17
Anæsthesia students													
Radiology students													
Ophthalmology students .													7
Otolaryngology students .													
Surgery students (advanced	CC	urs	e)								٠		30
Obstetrics and Gynecology s	tuc	deni	ts	(ad	vai	nced	d c	our	se)				12
Surgery students				•							•	•	5

The great number of courses that must be given in the Department, together with the fact that the great number of students in many of the courses prohibit all the students in a given course from being taught simultaneously, constantly stimulates the members of the staff to employ the time they have with students to best advantage. An experiment directed toward this end was tried with regard to the teaching

of histology last year as follows.

Acting on the premise that students in a given period of time learn far more from their professors if they come to them with prepared rather than with unprepared minds, the students taking Histology last year were given textbook reading assignments before each class. Time that otherwise would have been allotted to the delivering of elementary lectures to uninformed students was instead utilized for question and answer periods and discussions with informed students in their laboratory periods. It was found that in general students took their reading assignments seriously and indeed were inclined to resent any reiteration of material about which they already felt informed, and as a consequence student-teacher conversations were carried on at a higher level than usual.

The time allotted for the teaching of Histology to third year Biology and Medicine students is unfortunately not sufficient to give these excellent students as extensive a course as they deserve; they have much less time for the study of this subject

than have medical students.

During the year the Department suffered a profound loss, and its staff was greatly saddened, by the untimely death of Professor R. C. Ower. It is planned to assemble a collection of his very beautiful illustrations for a permanent exhibit in the Anatomy museum.

Professor D. L. J. Bilbey, who joined the staff only at the beginning of the year

resigned to begin the practice of medicine in British Columbia.

Professor K. O. McCuaig received a cross appointment in the Department of Anthropology of the University of Toronto and also was appointed a visiting Professor of Anthropology at the State University of New York at Buffalo where he gave a course to 26 students on Palaeontology.

SCHOLARLY ADDRESSES

Professor J. W. A. Duckworth, on "The Development of the Heart in Relation to Congenital Heart Disease" to the Biology Club, University of Toronto.

Professor A. W. Ham, on "Viruses and Tumours" to the student body, School

of Medicine, Tulane University, New Orleans, La.

RESEARCH

Professor J. W. A. Duckworth studied the development and structure of the

specialized conducting muscle of the hamster heart.

Professor A. W. Ham studied the sites of growth in the bones of mice of F1 hybrids in which the runting syndrome had been induced by injecting them at birth with immunologically competent cells from a parent. Cell growth in both cartilage and bone was profoundly affected. Since bone formation occurs in the midst of a rich capillary bed and cartilage growth occurs deep within a nonvascular intercellular substance, the finding that cartilage growth is impaired as much as bone growth suggests that the impairment of growth of these tissues is not a direct effect of circulating antibody but instead a secondary manifestation of the illness caused by the immunological effects of the transplanted cells being exerted elsewhere in the animal.

Professor K. O. McCuaig continued his studies on adolescent growth at the Burlington Growth Center, where standard anthropometric measurements are taken periodically on a group of 300 boys. Growth profiles and other data are being

accumulated on this extensive group.

Professor R. G. MacKenzie continued his study of the musculature in the junctional region between the esophagus and the pharynx, ascertaining the patterns of the muscle fibres with the intent of determining how diverticulae occur in this region.

Professor D. L. McLeod studied the effects of a phenylhydrazine-induced anaemia in newborn mice of a severity comparable with that seen in the runting syndrome. It was found that the growth of the bones of the newborn mice was greatly slowed as the anaemia developed which suggests that the impaired growth of bones in the runting syndrome induced by immunological means may be a secondary effect of the profound anaemia that is observed in the runting syndrome, and this in turn suggests that the primary immunological effect in the runting syndrome is directed against red blood cells and their precursors.

Professor C. G. Smith and Dr. F. Richardson completed their study of the blood supply of the visual cortex. The findings revealed that three vessels in addition to the calcarine branch of the posterior cerebral artery may contribute to the supply of this

important area. This explains some cases of macular sparing.

The distribution of the branches of the cerebellar arteries within the cerebellum is being investigated. The study is continuing but it is evident that, contrary to the usual teaching, the lateral part of the dentate nucleus receives its blood supply from the inferior cerebellar arteries, anterior or posterior, and not from the superior cerebellar artery.

Professor J. S. Thompson, in collaboration with Dr. A. G. Erwin of this Department, studied the development of mammary gland tissue from donor mice of certain strains implanted into F1 hybrids of these strains. Some of the work has been concerned with the development of tumours and hyperplastic nodules in the implanted glands. Studies have also been made on the ability of glands from male mice to differentiate, when implanted in female mice, under the influence of normal female hormonal stimuli, including pregnancy.

Studies on the genetic control of the development of differences in anatomical structures were commenced with work being confined largely to the vascular system. Already it would appear that some inbred strains of mice show definite differences in the patterns of branches of the subclavian artery. The normal configurations are not completely consistent even within strains but these patterns are under definite genetic control. Presumably several genetic factors, and possibly some environmental ones, are effective in determining the final pattern of blood supply to a region.

Material has been collected and preliminary studies made upon the single palmar crease (the so-called simian crease) which is a common occurrence in individuals with Down's syndrome and certain other congenital malformations. The structural defect (if indeed one exists) that causes this characteristic deformity is at

present unknown as is its relationship to the cause of the congenital defect.

Publications

HAM, A. W. Histology. 5th ed., Philadelphia: J. B. Lippincott. 1965. Pp. 1041. SMITH, C. G. "The Development of the Eye"; in The Eye in Childhood, chapter 1. Chicago:

Year Book Medical Publishers. 1966.

SMITH, C. G. and RICHARDSON, W. F. G. "The Course and Distribution of the Arteries Supplying the Visual (Striate) Cortex" (American Journal of Ophthalmology, vol. 61, no. 6, 1966, pp. 1391-6).

THOMPSON, J. S. and THOMPSON, M. W. Genetics in Medicine. Philadelphia: W. B. Saunders.

1966. Pp. 300.

ART AS APPLIED TO MEDICINE

Under the direction of Professor N. Joy

The Department has been moved from the Banting Institute to 256 McCaul Street, which is one block west of University Avenue and the second building south of College Street. The new site is closer than the old one was to the Medical Building, the Medical Library and the Clarke Institute and it is only a block and a half

away from the Banting Institute and Toronto General Hospital.

The move has resulted in a major improvement in working conditions, providing a great increase in space, better lighting and a more efficient arrangement of working areas. The third floor of the building, formerly an Ingram and Bell warehouse has been completely remodelled and transformed into two large studios, one small studio, and two work rooms for the constructing and assembling of models, displays and other large projects. In addition there are two small offices for administration; two small work rooms for movie animation and for varitype lettering; a good size storeroom, and a conference room or common room, depending on the needs of the moment.

The personnel in the Superintendent's Office who supervised the move have not only organized and expedited it with efficiency, but also with understanding and imagination. Mr. Labou in particular has the sincere gratitude of the A.A.M. staff.

One student, Margot Mackay, is expected to graduate this year and it is anticipated that the three other students enrolled in the course will pass this year very creditably. Several very promising applicants have been accepted provisional on their passing the art courses in which they are currently enrolled, but these numbers are disappointingly inadequate to meet the need. A university diploma is not a sufficient incentive to a professional illustrator who already holds a professional art school diploma. Nor is it considered an acceptable alternative by most art students who have their Grade XIII university entrance qualifications and the first half or more of a regular art school course, and the option of forfeiting their professional art diploma in favour of completing their training in the AAM Course.

This year Dr. Llewelyn Thomas was appointed chairman of the Advisory Committee to the AAM Department. The committee has held several meetings with the purpose of reviewing the content of the course to discover how near it comes to the standards required to qualify for a degree and what changes might be desirable.

Miss Margot Mackay had a drypoint engraving accepted for display in the 50th Annual Exhibition of the Society of Canadian Painter-Etchers and Engravers which took place on March 11 at the Royal Ontario Museum. It is difficult for a nonmember of this association to have work accepted for this highly competitive show.

A comprehensive exhibit on the life of Charles Kirk Clarke was designed by staff artists for the opening of the Clarke Institute.

SERVICE DEPARTMENT

Each year for the past few years the number of work requests has increased by

approximately 20 per cent a year but it is our opinion that the volume has increased by more than this figure indicates.

The addition of a photographer, which is anticipated for the session 1966-67,

will make possible more diversified and better service.

BACTERIOLOGY

Under the direction of Professor Philip Greey

No major changes were made in the undergraduate teaching.

Dr. Marion Ross, Chief of Service, Bacteriology, at Sunnybrook Hospital has retired but continues to supervise the laboratory on a part-time basis and assists in teaching.

Dr. Arthur Franklin, a Medical Research Council Associate, joins the staff of

the Department as an Associate Professor.

RESEARCH

Dr. R. C. French has studied the exclusion of intra-cellular lambda phage from induced E. coli Y10 (λ) by coliphage T4r⁺. The slow rate of adsorption of T4r⁺ to E. coli Y10 (λ) cells was improved by propagation of the bacteria in nutrient broth containing glucose. Under conditions of satisfactory adsorption it was found that T4, or ultraviolet irradiated T4, nearly completely excluded lambda development when added to UV induced cells as late as 30 minutes after induction. Less than 2 per cent of the induced cells were refractory to T4 infection. By 50 minutes after induction T4 still excluded lambda from 50 per cent of the cells, but by 70 minutes most of the cells were committed to the production of lambda phage.

Dr. G. H. Hawks, at St. Michael's Hospital, has continued to determine the sensitivity to penicillin of gonococci and the presence of auto-antibodies in thyroid

disease using the tanned red cell technique.

Dr. Peter Fleming, at the Hospital for Sick Children, is continuing a study of

the cephalosporins and the purification of cephalosporinase.

Miss Joan Hennessy has continued efforts to isolate a viral or other transmissible agent from cases of cat scratch disease. Acute stage sera, plasma and white cells are being tested on a variety of human and animal tissue culture cell lines. Results so far obtained in animal tissue culture cell lines show promise, and further studies are being carried out.

Bacteriological studies are continuing with the Division of Urology, Toronto

General Hospital, on patients undergoing transurethral prostatectomy.

Methods for elimination of mycoplasma from tissue culture cell lines are being studied, and the strains of mycoplasma grown from twelve lines of tissue culture cells are being compared for growth requirements and biochemical reactions.

Experiments on the transfer of antibiotic resistance between E. coli strains and

Salmonella are being studied.

Dr. A. E. Franklin has used a number of tissue culture cell lines inoculated with a wide range of viruses to study the effects of virus-inoculated cells on platelet aggregation in a collaborative study with Dr. J. F. Mustard. The McCoy line of synovial cells and Earle's 'L' cells appear to be the most promising host cells. Agents included in this study were representative enteroviruses, measles, mumps, Herpes simplex, vaccinia, adenovirus, Newcastle disease virus, epizootic haemorrhagic disease of deer, tissue specimens of Aleutian mink disease, psittacosis, infectious hepatitis specimens and synovial fluids from patients with rheumatoid arthritis and osteoarthritis. Some of these agents have been associated with platelet aggregation when evaluated in the Coulter counter. In addition, a wide range of bacterial suspensions have been used in platelet aggregation studies. Electron microscopy has been used in some of these experiments to visualize host-agent relationships at the cellular level. Some

virus preparations have been inoculated intravenously into rabbits to demonstrate a thrombocytopenic effect. A platelet permeability factor has been demonstrated to be cytopathic in tissue culture and electron microscopic studies are in progress to determine the nature of this damage. Collaborative studies have been continued with Dr. H. Z. Movat on the effect of intact leucocyte granules, lysed granules, antigenantibody complexes and a permeability factor from polymorphonuclear leucocytes in tissue cultures at the light and electron microscope levels. Collaborative studies with Dr. D. A. Gordon have involved studies of the effect of various synovial fluids on tissue cultures in attempts to demonstrate a transmissible agent or agents from patients with rheumatoid arthritis. Thirteen of 20 synovial fluids from patients with rheumatoid arthritis have been associated with transmissible cell degeneration, whereas 4 of 4 synovial fluids from patients with osteoarthritis were negative under similar conditions. Platelet aggregation studies with synovial fluids in tissue culture have yielded consistent and encouraging results. In addition, rheumatoid bodies have been produced in vitro and were studied by light and electron microscopy. Two new tissue culture lines have been developed from human embryonic aortic endothelium and pig aortic endothelium for use as host cells for isolation of possible infectious agents in rheumatoid arthritis and Aleutian mink disease (viral plasmacytosis).

Dr. J. C. Sinclair and his associate Miss Barbara K. Buchner, M.A., are studying, by tissue culture methods, marmoset specimens from the controlled experiments which Professor F. Deinhardt and Dr. A. W. Holmes of the Presbyterian–St. Luke's Hospital, Chicago, are conducting to determine if the marmoset, one of the smallest primates, may be of value as an experimental animal for the study of infectious hepatitis. This tissue culture project is a conjoint study with Professor Deinhardt's

group.

Publications

GREEY, P. H. "Staphylococcus albus—a Potential Pathogen" (editorial). (Canadian Medical Association Journal, vol. 93, no. 1, July 3, 1965, pp. 38-9).

———— Reviews, Canadian Medical Association Journal, vol. 92, no. 18, May 1, 1965, p. 990; vol. 92, no. 18, May 1, 1965, p. 992.

HAWKS, G. H. "Antibiotic Therapy of Staphylococcal Infections" (Canadian Medical Association Journal, vol. 93, no. 16, Oct. 16, 1965, pp. 848-53).

—— Review, Hospital Administration in Canada, vol. 8, no. 4, April, 1966, p. 52.

Roy, T. E. "Bacterial Interference and Staphylococcal Infection" (editorial) (Canadian Medical Association Journal, vol. 93, no. 3, July 17, 1965, pp. 126-7).

BIOCHEMISTRY

Under the direction of Professor G. E. Connell

During the past year 512 students have received instruction in the Department of Biochemistry, the distribution being as follows:

Faculty of Medicine (first medical year)	5
Faculty of Arts (third year honour courses)	
(fourth year honour courses)	
	-
School of Graduate Studies	/
(a) Major subject Biochemistry	
Post-doctoral Fellows	
Candidates for Ph.D 8	
Candidates for D.Clin.Sci	
Candidates for M.Sc	
(b) From other departments 63	
(c) Special Students	
Apparent company and color	-
Total 512)

Among the graduate students 3 held fellowships of the Medical Research Council, 4 held scholarships of the National Research Council, and 7 held Province of Ontario graduate scholarships. Fourteen students were granted teaching fellowships by the Department. The post-doctoral fellows were supported by awards from the National Research Council and by the Banting Research Foundation.

The following students registered in the Department of Biochemistry completed

work and presented theses for graduate degrees as follows:

Ph.D. degree:

DUNKLEY, MRS. C. R.

"Phosphate Uptake by Isolated Frog Muscle"

Davis, K. A.

"Glyoxalase I"

D. Clin. Sci. degree:

Ozge-Anwar, Dr. A. H.

"A Study of the Proteins Involved in Blood Coagulation"

M.Sc. degree:

MAUNG, M.

"Structural and Metabolic Studies of Animal Haptoglobins"

TATTRIE, MRS. BRENDA L.

"Structural Studies on Human Haptoglobin"

Professor C. S. Hanes, who resigned from the chairmanship of the department in July 1965, began a nine-month study leave in Cambridge, England, the following January. He will return to take up his duties as Professor in September 1966. Professor R. K. Murray began an extended leave of absence which he will spend at the University of Wisconsin. During the year Professors W. Thompson, J. T. Wong and

W. A. Green joined the staff of the department.

Visiting lecturers under the auspices of the School of Graduate Studies included: Dr. R. G. Spiro, Elliott P. Joslin Research Laboratory, Harvard Medical School; Dr. Q. Gibson, Department of Biochemistry, Cornell University; Dr. B. Vennesland, Department of Biochemistry, University of Chicago; Dr. Morris Kates, Division of Applied Biology, National Research Council, Ottawa; Dr. L. Smillie, Department of Biochemistry, University of Alberta, Edmonton; Dr. L. Berlinguet, Department of Biochemistry, Laval University, Quebec; Dr. E. W. Abrahamson, Case Institute of Technology, Cleveland, Ohio.

RESEARCH

Members of the Department have received generous grants from the Medical Research Council, the National Research Council, the Canadian Arthritis and Rheumatism Society, the Wellcome Foundation, the Banting Research Foundation, and the University of Toronto Cancer Research Committee.

Professor R. A. Anwar has continued his study of elastin and its degradation under the action of elastase. With the assistance of Mr. G. Oda he has developed a procedure for the degradation of desmosine and isodesmosine and has used this method to elucidate in part the pathway of biosynthesis of these amino acids. Mrs. S. Jackson has isolated a pure form of some of the peptides liberated by the action of elastase on elastin. Mr. K. G. Gunetileki has begun work on the biosynthesis of bacterial cell walls.

In Professor Connell's laboratory Dr. A. F. Lewis, Miss Nancy Hogg and Miss Lorraine Steen have worked on various aspects of the structure of immunoglobulins. Dr. Lewis has been investigating the structure of a pathological immunoglobulin which has several unique properties. Mrs. I. Csermely has provided able technical assistance in this work. Professor Connell has completed a study of the enzymatic fragmentation of immunoglobulins in which he collaborated with Dr. R. H. Painter of Connaught Laboratories. Mrs. B. Tattrie and Mr. W. Campbell have carried on structural investigations of human haptoglobin.

Professor J. Manery Fisher and Mrs. E. E. Dryden have been studying the effect of insulin on the permeability of frog muscle to glusose and to C¹⁴-labelled lactate. With Dr. C. R. Dunkley they have shown that, on or close to the surface of isolated muscle bundles, an enzymatic system exists which converts ATP (provided in the external medium) to IMP. That the conversion is stoichrometric was demonstrated by analysing the medium for adenine and inosine nucleotides, for inorganic phosphate and ammonia. None of the three enzymes involved (ATPase, Adenylate kinase and AMP deaminase) was found in the medium after removal of the muscles, indicating that they had not leaked from the muscle interior. Mrs. T. Ambus has been testing the influence of insulin and lactate on the recovery of K-depleted, Na-loaded muscles. Mr. R. Boegmann has made good progress in his attempt to isolate and separate on sucrose gradients the various membrane fractions of skeletal muscle. His aim is to obtain the external sarcolemma of the muscle fibre and to study the enzymes likely to be involved in phosphate and cation transport.

Professor Hofmann has investigated the role of the N-terminal amino acid in the active site of proteases. This general project arises out of the work of Mrs. Scrimger on trypsin. The central role of the N-terminal isoleucine in the active site of trypsin has been established beyond doubt. Dr. Gertler, a post-doctoral fellow from Israel, has been able to show that the N-terminal valine of elastase has a function which is analogous to that of the isoleucine of trypsin. On the other hand the N-terminal isoleucine of pepsin is not necessary for the activity of that enzyme. Studies on the trypsinogen activity enzyme of Penicillium janthinellum have been continued. Dr. Thangamani has studied the biosynthesis of the enzyme using radioactive tracers. Contrary to other reports she has found no evidence for the existence of a precursor of the enzyme. Miss Dixon has continued her work on the development of facilities and methods for the large-scale production of this enzyme. In addition to these two major projects Miss S. Wasi working in collaboration with Dr. Movat, Department of Pathology, has continued her studies on the chemistry of leucocyte factors responsible for increasing permeability in surface tissues of laboratory animals.

In Professor Schachter's laboratory, Mr. R. Lawford has continued his work on glycoprotein synthesis by rat liver and bovine submaxillary gland slices. He has found that incorporation of carbohydrate into glycoprotein occurs on the smooth and rough microsomes of rat liver. Mr. Lawford has also discovered that a ribonuclease inhibitor in rat liver is needed for preparation of polyribosomes from rat liver cytoplasm and nuclei. Dr. T. Corkum has developed a rapid method for isolating human chorionic gonadotrophin from urine and is studying the structure of this hormone. Mr. C. Burrowes is studying the role of methionine in the activation of chymotrypsinogen to chymotrypsin by the technique of chemical modification.

Dr. W. Thompson is studying the metabolism of phosphoinositides, a group of related phospholipids exhibiting high metabolic activity in the central nervous system. With Mr. Kevin Keough experiments are under way to determine the subcellular distribution of enzymes hydrolysing the phosphoinositides in brain and in other tissues. In collaboration with Dr. D. Parsons an examination of lipids in different membrane fractions from liver mitochondria has been undertaken. Significant differences in phospholipid content and in the distribution of acidic phospholipids (phosphatidylinositol and cardiolipin) between outer and inner membranes have

been noted.

In Professor Williams' laboratory Mr. K. A. Davis has carried out a partial purification of glyoxalase I from bovine liver and has studied the early phases of the kinetics of this enzyme. His data point clearly to a non-enzymically formed product of glutathione and methyl glyoxal as the true substrate. Mrs. H. Jeng Tsai has studied the interaction of cytochrome c with an ATP-ADP exchange enzyme isolated from liver mitochondria. Studies on the control of the tricarboxylic acid cycle have been carried out by Miss S. M. F. Ferguson and Mrs. S. C. Stuart. Miss Ferguson's work has concerned a specific effect of dicarboxylic acids on the rate limiting step in

isocitrate metabolism. Mrs. Stuart has been concerned with the control of pyruvate metabolism by ADP and has been able to distinguish between effects of this nucleotide which are exerted directly (as an allosteric ligand) and those which occur as a consequence of a change in the redox steady state of mitochondrial nicotinamide nucleotides. Collaborative work with Professor D. F. Parsons of the Department of Medical Biophysics on the functional significances of mitochondrial fine structure has continued.

Professor Wong has initiated a study of the regulation of levels of amino acid specific sRNA's in bacterial cells. By determining these levels as a function of growth rates in normal and mutant cells it has been shown that the regulation is not mediated through the supply of amino acids. An exceptional instability of histidine-sRNA has been observed and is being investigated.

SCHOLARLY ADDRESSES

Professor G. E. Connell, "An Atypical Immunoglobulin," Canadian Federation of Biological Societies, June 1966; "Enzymes Which Act on γ -Glutamyl Peptides," McGill University, October 1965; "Structure and Function of Immunoglobulins," Advanced Graduate Course, American College of Physicians, March 1966. Professors G. E. CONNELL and A. SZEWCZUK, "γ-Glutamyl Lactamase," Toronto Biochemical and Biophysical Society, January 20, 1966. Professor T. Hofmann, "Structure and Function of Trypsinogen and Trypsin," McMaster University, January 1966; "Extracellular Enzymes from Penicillium and the Activation of Trypsinogen," Queen's University, October 1965. Mrs. S. Scrimger and Professor T. Hofmann, "Studies on the Active Site of Trypsin," Toronto Biochemical and Biophysical Society, January 20, 1966. Professor J. F. Manery, "The Effects of Calcium Ions on Membranes," (Seminars on Biophysics and Physiol. Chemistry of Connective Tissue, Stowe, Vt., October 1965); "Connective Tissue Electrolytes," (Seminars in Biophysics and Physical Chemistry of Connective Tissue, Stowe, Vt., October 1965). Professors C. R. Dunkley, J. F. Manery, and E. E. Dryden, "The Conversion of ATP to IMP by Muscle Surface Enzymes," Toronto Biochemical and Biophysical Society, May 1966. Professor H. SCHACHTER, "The Subcellular Site of Glycoprotein Biosynthesis," The First Annual Meeting of Canadian Society for Cell Biology, Queen's University, Kingston, May 19, 1966. Professors R. LAWFORD and H. SCHACHTER, "Inhibition of Polyribosome Breakdown by Rat Liver Supernatant," Toronto Biochemical and Biophysical Society, March 1966. Professors S. C. STUART and G. R. WILLIAMS, "The Distinction Between Allosteric Effects and Redox Mediated Effects of ADP on Pyruvate Metabolism in Isolated Mitochondria," Toronto Biochemical and Biophysical Society, May 1966. Professor J. Tze-Fei Wong, "Regulation of sRNA Synthesis in E. Coli," Toronto Biochemical and Biophysical Society, March 1966.

PUBLICATIONS

ANWAR, R. A. "The Biosynthesis of Desmosine and Isodesmosine" (Federation Proceedings, vol. 25, no. 2, Mar.-April, 1966, p. 715).

----- "Comparison of Elastins from Various Sources" (Canadian Journal of Biochemistry, vol. 44, no. 6, June, 1966, pp. 725-34).

CONNELL, G. E. and PAINTER, R. H. "Fragmentation of Immunoglobulin during Storage" (Canadian Journal of Biochemistry, vol. 44, no. 3, March, 1966, pp. 371-9).

(Canadian Journal of Biochemistry, vol. 44, no. 3, March, 1966, pp. 371-9).

DAVIS, K. A. and WILLIAMS, G. R. "Cation Activation of Glyoxalase I" (Biochimica et

Biophysica Acta, vol. 113, no. 2, Feb., 1966, pp. 393-5).

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(Canadian Journal of Biochemistry, vol. 43, no. 12, Dec., 1965, pp. 1995-6). TSAI, H. JENG and WILLIAMS, G. R. "Carboxymethylation of the Methionine Residues of Cytochrome C" (Canadian Journal of Biochemistry, vol. 43, no. 9, Sept., 1965, pp. 1409-15). Wong, J. T. "The Possible Role of Polyvalent Carriers in Cellular Transport" (Biochimica

et Biophysica Acta, vol. 94, no. 1, Jan., 1965, pp. 102-13).

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COMMITTEE ON ANIMAL CARE

Under the chairmanship of Professor A. G. Gornall

The Committee met as circumstances required during the year. In July Dr. F. H. Steinbeck joined our staff as veterinarian and Director of Animal Care. He was granted leave-of-absence for November and December to complete his thesis and examinations for the D.V.M. degree from the veterinary college in Hannover. Dr. Steinbeck has provided an excellent diagnostic, treatment and operating room service for research workers in the Banting Institute and has been called in consultation by workers in other animal care facilities.

University support of the Committee amounted to approximately 33 per cent of our total budget during 1965-66, a slight improvement over last year which we hope can be maintained. Salaries for non-academic staff have also improved and by next year will approximate recommended levels. Requests for animal care continue to overcrowd the capacity of our facilities and the lack of quarantine space remains

a particularly vexing problem.

Reported by Dr. F. H. Steinbeck

During the academic year 1965-66 the facilities of the Committee on Animal Care were used by 33 researchers. Species housed included cats, dogs, guinea-pigs, rats, rabbits, sheep, calves, pigeons and ground hogs. The operating room facilities

were used for 564 surgical procedures, mainly sterile.

The following diseases and parasitic conditions were diagnosed in the animal colony: (a) dogs—canine distemper, infectious hepatitis, tracheobronchitis, gastroenteritis, rhinitis, and ecto- and endoparasites; (b) cats—feline distemper, bronchopneumonia, pneumonitis, enteritis, bacterial and parasitic otitis externa; (c) rabbits— Pasteurellosis, pneumonia, conjunctivitis, mucoid enteritis, intestinal and hepatic coccidiosis, and ear mite infestation; (d) rats—chronic respiratory disease, rhinitis; (e) guinea-pigs—dermatitis and subcutaneous abscesses. These problems indicate the great need for additional space to provide for the isolation of sick and newly purchased animals.

The facilities of the animal colony were improved by new stainless steel and fibreglass dog cages. Air conditioning for rats, rabbits and guinea-pigs has been installed. At present all dogs are vaccinated against canine distemper and hepatitis,

and all cats are vaccinated against feline panleukopenia. Quarantine is carried out as far as possible. Two new animal room attendants hve been employed and are

being trained to give them an all-round knowledge of animal care.

Additional equipment was purchased for the animal operating room, including a second Harvard respiratory pump. New methods of anaesthesia and analgesia were introduced to serve the individual needs of the various research projects. The veterinary laboratory facilities have been extended to provide better diagnostic service.

PUBLICATIONS

Steinbeck, F. H. "Ueber die Samenübertragung beim Rind in Kanada unter besonderer Berücksichtigung des Einsatzes des Spermatiefgefrierverfahrens" (Inaugural Dissertation, Doctor Medicinae Veterinariae, Veterinary College, Hannover, Germany, 1966, pp. 1-61).

MEDICAL BIOPHYSICS

Under the direction of Professor H. E. Johns

During the last year Professor H. E. Johns received the Charles Mickle Fellowship which is awarded annually by the Faculty of Medicine. Professor L. Siminovitch was appointed to the panel on infectious diseases of the National Institute of Health, Washington.

Undergraduate teaching. Professor Johns gave half of the course in Physics to premedical students. Professor Howatson gave Physics 460 to physics and biology

students. Professor McCulloch gave the course in Clinical Microscopy.

Graduate teaching. Last year 36 students were enrolled in the Department doing graduate work towards the M.A. and Ph.D. degrees. Ten postdoctoral fellows pur-

sued research studies in the Department.

Postgraduate teaching. Professors Axelrad, Baker, Cinader, Howatson, McCulloch, Siminovitch and Till gave postgraduate lectures for the Division of Postgraduate Medical Education. Professor Cunningham gave the physics part of the diploma course in Radiology.

SCHOLARLY ADDRESSES

Professor N. ASPIN, with A. Sass-Kortsak, "Radiocopper Studies in Patients with Wilson's Disease and in Heterozygotes," International Symposium on the Biochemistry of Copper, Harriman, N.Y., 1965. Professor A. A. Axelrad, "Genetics in Medical Research," "Tumor Immunology," Advanced Postgraduate Course, August 1965; "Genetic Control of Susceptibility to Friend Leukemia Virus in Mice: Studies with the Spleen Focus Assay Method," International Conference on Murine Leukemia, Philadelphia, Pa., October 1965; "Genetic Control of Friend Leukemia Virus Infection in Mice," Seminar, Rockefeller Institute for Medical Research, February 1966; "Genetic Control of Susceptibility to a Leukemia Virus in Mice," Seminar, Department of Microbiology, Queen's University, Kingston, Ont., and Seminar, Human Genetics Sector, McGill University, Montreal, February 1966. Professor R. G. BAKER, "Selection of Parameters of an Optimum Gamma Camera System," Radiological Society of North America, Chicago, Ill., December 1965. Professor W. R. BRUCE, "Action of Chemotherapeutic Agents on Normal Hematopoietic and Transplanted Lymphoma Colony-forming Cells," Roswell Park Memorial Institute, Buffalo, N.Y., October 1965; "Studies of the Action of Chemotherapeutic Agents at the Cellular Level," January 1966, to Pathology Society of Toronto, Clinical Research Society of Toronto, and Southwest Cancer Chemotherapy Study Group, New Orleans; February 1966 to Southern Research Institute, Birmingham, Alabama, and Department of Medicine, Emory University; May 1966 to Sick Children's Hospital, Grand

Rounds. Professor W. R. Bruce, "Cellular Radiation Biology," Camp Borden, Ontario, January 1966; "The Sensitivity of Normal Hemopoietic and Transplanted Lymphoma Colony-forming Cells to Chemotherapeutic Agents in vivo," Chronic Leukemia Task Force Meeting, Atlanta, Georgia, February 1966; "Comparative Sensitivity of Normal Hematopoietic and Transplanted Lymphoma Colony-forming Cells to Chemotherapeutic Agents Administered in vivo," National Cancer Institute, Cell Kinetics Discussion Group, Bethesda, Md., February 1966; with H. Madoc Jones, "The Sensitivity of Proliferating and Non-Proliferating Cells to 5-fluorouracil (FU)," American Association for Cancer Research, Denver, Col., May 1966.

Professor B. Cinader, "Regulation of the Antibody Response," "Acquired Immunological Tolerance to Autologous Proteins as a Regulatory Mechanism," International Symposium, Academy of Medicine, Toronto, January 1966; "Reenforcement of Tolerance by Cross-Reacting Antigens," Antibody Workshop, Weizmann Institute of Science, Rehovoth, Israel, March 1966; "Immunological Tolerance," American College of Physicians, Toronto Academy of Medicine, March 1966; "An Antigen- and Complement-Deficiency in Mice," Third Annual Seminar Series of the Division of Immunology at Duke Medical Center, Durham, N.C., May 1966. Professor J. R. Cunningham, "Use of Computers in Radiation Dosimetry," Vienna, International Atomic Energy Agency, Panel, October 1965; "Computer Applications in Radiation Dosimetry and Therapy," on the I.A.E.A. Vienna Panel, November 1965, Chicago. This meeting was held in conjunction with the annual meeting of the Radiological Society of North America. Professor Harvey Eisen with L. Siminovitch, "Studies on Defective Lambda Bacteriophage," Cold Spring Harbor Sym-

posium, Cold Spring Harbor, N.Y., August-September, 1965.

Professor M. J. Fraser, "Some Problems in the Biosynthesis of Amino Acid Acceptor RNA in vitro," Seminar, Montreal Cancer Institute, November 1965; "Protein Biosynthesis," and "The Genetic Code and Protein Biosynthesis," Lectures, Department of Biochemistry, Queen's University, Kingston, Ont., Janauary 1966. Professor C. R. Fuerst, "Physiological Genetics of Lambda Development," Rockefeller University. Professor A. F. Howatson, "The Structure of Viruses and their Effects on Cells," Seminar, Department of Pathology, Ohio State University, Columbus, Ohio, 1965; "The Contribution of Electron Microscopy to the Study of Virus Structure," Lecture to Electron Microscopy Society, Ohio State University, Columbus, Ohio, 1965; "Viruses," Lecture to Sophomore Medical Class, Ohio State University, Columbus, Ohio, 1965; "Tumour Virus News from Abroad," Department of Medical Microbiology, St. Thomas's Hospital, London, England, September 1965; "Viruses and Leukemia," College of Physicians and Surgeons of Columbia University, New York, October 1965; "Morphology of Tumour Viruses," Symposium on Viruses + Cancer, New York Academy of Medicine, March 1966; "The Fine Structure of Striated and Cardiac Muscle and the Sarcoplasmic Reticulum," and "Viruses Associated with Human Leukemia," American College of Physicians, Toronto Academy of Medicine, Toronto, Ont., March 1966. Professor J. W. Hunt, "E.S.R. Spectra of Cyclohexane and its Derivatives," Seminar, Argonne National Laboratory, December 1965.

Professor H. E. Johns, "The Molecular Nature of Radiation Lesions as Deduced from Experiments with UV Light," XI International Congress of Radiology, Rome, Italy, September 1965; "Cancer, Radiation and the Cell," Canadian Cancer Society Toronto District Officers Annual Meeting, Toronto, Ont., November 1965; "Cancer, Radiation and the Cell," Royal Canadian Institute, Toronto, Ont., January 1966; "UV Photochemistry of Nucleic Acids," Sloan Kettering Institute, New York, N.Y., January 1966; "Biophysics and the Cell," Mathematics and Physics Club, University of Toronto, Toronto, Ont., March 1966; "UV Effects on Nucleic Acids," Biology Division, Atomic Energy of Canada Ltd., Chalk River, March 1966; "Cancer, Radiation and the Cell," Laval University, Group of Biologists and Physicists, Quebec, March 1966; "Cancer Research," Toronto Section of the Chemical Institute of Canada, April 1966; "UV Effects on Polynucleotides," Honey Harbour Conference,

Honey Harbour, Ont., June 1966. Professor E. A. McCulloch, "Cellular Factors in Recovery after Radiation," Brookhaven National Laboratory, Assc. Universities Inc., Upton, L.I., N.Y., October 1965; "Malignant Disease," Medical Alumni Association, University of Toronto, Toronto, October 1965; "Control of Hemopoiesis: Physiological and Genetic Approaches," Queen's University, Kingston, Ont., October 1965; "Studies on the Control of Hemopoietic Proliferation Land Differentiation," Roswell Park Memorial Institute, Buffalo, N.Y., November 1965; "Studies on the Control of Proliferation and Differentiation in Mouse Hemopoietic Tissues," 20th Annual Meeting Western Regional Group Medical Research Council and National Cancer Institute of Canada, Suffield Experimental Station, Ralston, Alberta, March 1966; "Renewal of Cell Population in the Body," American College of Physicians Course, Faculty of Medicine, Toronto, March 1966; "Mechanisms in Virus Neoplasia," American College of Physicians Course, Faculty of Medicine, Toronto, March, 1966; "Studies on the Regulation of Hemopoiesis in Mice," 57th Annual Meeting, American Association for Cancer Research, Denver, Colorado, May 1966.

Professor D. F. Parsons, "Characterization of Isolated Outer and Inner Membranes of Mitochondria," New York Academy of Science, Conference on Cell Membranes: Recent Progress; "Mitochondrial Morphology," Meeting and Panel discussion, Philadelphia and New York, American Society of Cell Biology, November 1965; "Low Angle X-ray Scattering," Symposium sponsored by Hospital for Special Surgery, Cornell University Medical College, January 1966; "Determination of the Helical Structure of Poly-A by Electron Diffraction," Boston Biophysical Society, February 1966; "Mitochondria Structure and Function," Round Table Discussion on Mitochondrial Structure and Compartmentation, Bari, Italy, May 1966; "Ultrastructural and Molecular Aspects of Cell Membranes," 7th Canadian Cancer Re-

search Conference, Honey Harbour, Ont., June 1966.

Dr. A. M. Rauth, "Effects on Ultraviolet Light on Mammalian Cells," Toronto Biophysical and Biochemical Society, Boston; "Nature of Caffeine Sensitized Damage

in Mouse L Cells," Biophysical and Biochemical Society, Boston.

Professor L. Siminovitch, "Studies on Defective Lambda Bacteriophage," Graduate Course in General Virology, University of Chicago, Chicago, Ill., November 1965; "Studies on Defective Lambda Bacteriophage," Cold Spring Harbor Symposium, Cold Spring Harbor, N.Y.; University of Chicago, Chicago, Ill.; University of Western Ontario, London, Ont.; McMaster University, Hamilton, Ont.; Yale University, New Haven, Conn.; "Proliferation and Differentiation of Hemopoietic Stem Cells," Massachusetts Institute of Technology, Cambridge, Mass.; "Nucleoproteins and Heredity," American College of Physicians and Surgeons, Toronto, Ont.; "The Nature of Bacteriophage Development as Examined with Lambda Bacteriophage," Canadian Cell Biologists, Queen's University, Kingston, Ont., and Canadian Society of Plant Physiologists, Vancouver, B.C.; Chairman, Session on Metabolic Regulators, 7th Canadian Cancer Research Conference, Honey Harbour, Ont.; "Early Mutants of Lambda," Gordon Conference on Nucleic Acids, New Hampton School, New Hampton, N.H.

Professor J. E. Till, "Proliferation and Differentiation of the Stem Cells of the Blood-forming System," Pennsylvania State University, Philadelphia, Pa., July 1965; Symposium on Topics in the Biology of Aging at the Salk Institute for Biological Studies, La Jolla, Calif., November 1965; "Stem Cells and Radiation Effects due to Marrow Failure," Atomic Energy of Canada Ltd., Division of Biology and Health, February 1966; "Recent Studies on Colony-forming Stem Cells of the Mouse Hemopoietic System," University of Western Ontario, London, Ont., February 1966. Professor G. F. Whitmore, "Recovery Processes in Irradiated Mammalian Cells," Biology Division, Argonne National Laboratory, 1965; "Radiobiological Studies on Mammalian Cells," Xth International Congress of Radiology, Rome, July 1965; "A Refresher Course in Mammalian Cell Radiobiology," Radiological Society of North America, Chicago, October 1965; "Studies on Recovery Processes in Mammalian Cells," Symposium on Radiobiology and Radiotherapy, Colorado Springs, Colorado,

1965; "The Radiobiology of Synchronized Mammalian Cells," Department of Radiology, Columbia University, November 1965.

RESEARCH

The research work of the Department entailed a great deal of collaboration between various members of the staff along the following lines: (1) Molecular Radiation Biology, (2) Structure of Viruses and Subcellular Particles, (3) Studies on Viruses, (4) Effects of Radiation and Drugs on Mammalian Cells, (5) Studies on Blood Forming Cells, (6) Immunological Studies, (7) Biochemical Studies, (8) Clinical Physics Applied to Radio-diagnosis and Radiotherapy.

Molecular Radiation Biology

Professor Hunt has been continuing his studies of the transient intermediates produced by ionizing radiation in systems of biological interest. During the winter,

1965-66, he was on sabbatical leave in the Argonne National Laboratory.

Professor Hunt, with Mr. P. Leung, using electron spin resonance techniques, has been studying the radiation-induced free radicals occurring in cyclohexane, and its derivatives, and correlating these free radicals with the radiation products. In mixtures of cyclohexane with small amounts of a cyclohexane derivative, it has been

shown that much of the damage is concentrated in the derivative.

Professor Hunt, with Mr. C. L. Greenstock, is constructing a pulse radiolysis apparatus which will be used to study short-lived radiation products by observing their transient optical absorption. The pulsed radiation source, a linear accelerator, has recently been installed in the Physics Department. Through the courtesy of the Argonne National Laboratory, the absolute reaction rates of certain nucleic acids and nucleotides with solvated electrons were measured, and shown to be largely dependent upon the charge on the molecule. In addition, in collaboration with Dr. J. K. Thomas, a pulse radiolysis apparatus was constructed at the Argonne Laboratory with which radiation products having lifetimes as short as 5×10^{-9} seconds were observed, a factor of a hundred times shorter than had been possible previously.

Professor Johns, and Professor Whitmore, Professor Rauth, Dr. Weinblum and Dr. Sarin, are continuing to study the nature of the radiation damage produced in

nucleic acids by ultraviolet radiation.

Dr. Weinblum with Professor Johns has been able to isolate large quantities of the four types of thymine dimers and to measure their cross-sections and quantum

yields for their reversal.

Professor Johns in collaboration with Mr. I. Brown has completed a detailed study of the photochemistry of UpU and shown that three dimers and a hydrate are produced. Mathematical methods for analysing the data and determining the

photochemical cross-sections have been developed.

Professor Johns in collaboration with Dr. Mark Pearson has completed a detailed study of the photochemistry of poly U. They have shown that hydrates and dimers are produced in poly U as would be expected from previous results with UpU. However these photoproducts are not produced in the chain at random but appear in dimer-rich sequences. The behaviour of poly U is drastically altered when it is hydrogen-bonded to poly A. Under these circumstances the production of hydrates is drastically suppressed. Furthermore the few hydrates that are produced tend to be next to dimers, suggesting that dimers bring about a region of localized melting between the poly A and poly U chains after which hydrates can be produced.

Professor Whitmore in collaboration with Mr. P. Ottensmeyer is continuing his studies on the ability of irradiated polynucleotides to carry out the various functions required of these compounds in the synthesis of protein. In particular these studies are now concerned with changes in the coding properties of UV-irradiated trinucleotides when used in the protein synthesizing system developed by Nirenberg

and his associates.

Professor Rauth has continued his studies of the repair of damage produced by ultraviolet light in mouse L cells. The ability of these cells to form colonies after irradiation can be changed drastically by their post-irradiation treatment. He has found that irradiated cells which are immediately grown in the presence of caffeine have a much lower survival than those grown in the absence of caffeine. The sensitizing effect of caffeine disappears if the cells are grown for one generation in its absence.

Professor Whitmore is continuing his studies on the ability of mammalian cells to recover from certain types of radiation damage. Recently these studies have demonstrated the existence of a class of potentially lethal radiation lesions. This is a class of lesions which, under certain physiological conditions as yet not completely defined, can bring about the death of the cell but which under other conditions may be repaired and leave a viable cell. The relationship between these lesions and the sublethal lesions reported by other workers is being explored. It may be that in fact these lesions are the same, in which case some present concepts of the nature of radiation damage may have to undergo certain revisions.

Structure of Viruses, Subcellular Particles and Cell Components

Professor Howatson in collaboration with Dr. Kemp has been studying the structure of erythrocyte membranes and the effect on these membranes of various enzymes and detergents. The action of these agents on viral envelopes and on "synthetic" membranes consisting of lecithin, cholesterol and mixtures of these substances has also been investigated.

Dr. Kemp and Professor Howatson in collaboration with Professor Siminovitch and Professor Fuerst have been examining in detail the structural defect in λ -bacteriophage that are characteristic of mutations in certain regions of the viral chromo-

some, as part of a general study of the physiological genetics of this virus.

Professor Parsons together with Professor G. R. Williams (Department of Biochemistry) and Professor B. Chance (University of Pennsylvania) have developed a method to separate and purify the outer and inner membranes of mitochondria. Electron microscopy, enzymatic analysis and low temperature difference spectrophotometry were used to characterize the membranes. Lipids were determined by Professor W. Thompson. The two membranes were found to be very different in fine structure, lipid composition and enzymatic activity. The inner membrane showed projecting 90A protein subunits whereas the outer membrane had none. The outer membranes of some plant mitochondria showed 25-30A pits in its surface. In collaboration with Professor E. Racker (New York University) the subunits have been identified with the oligomycin-sensitive ATPase of mitochondria. The inner membrane had a relatively low lipid content and the outer membrane a high lipid content. Both membranes were rich in lecithin and cephalin but the inner membrane contained large amounts of cardiolipin. The cardiolipin is considered to play an important role in both electron transport via the cytochromes and in changing the permeability of the membrane under the influence of divalent cations. Cytochrome oxidase and all the oxidative phosphorylation-coupled cytochromes were found to be restricted to the inner membrane. The outer membrane contained cytochrome b₅ and a NADH₂-cytochrome c reductase system similar to that present in endoplasmic reticulum. A detailed comparison has been made between the smooth endoplasmic reticulum and the outer membrane of mitochondria. It is considered that the mitochondrial membrane may be derived from endoplasmic reticulum. Further studies of the heme, enzyme and lipid distribution of endoplasmic reticulum and the two mitochondrial membranes are in progress with a view to obtaining a better understanding of the role of the membranes in mitochondrial function.

Professor Parsons, in collaboration with Professor S. C. Nyburg, has continued electron diffraction studies of biological materials. A general programme for calculating the cylindrically averaged Fourier transform for expected diffraction intensities of helical macromolecules has been devised for the IBM 7094 computer. With its

aid electron diffraction data on an α -helical form of polybenzyl L-glutamate and a paired base double helix form of polyadenylic acid are being analysed. Since electron diffraction atomic scatter factors are different from those for X-rays, the analysis provides an independent check of the structure of these compounds. Recently, it proved possible to grow microcrystals of a synthetic phospholipid,— β , γ -dipalmitoyl-DL- α -phosphotidyl ethanolamine. Single crystal electron diffraction patterns were obtained using special electron microscope techniques to reduce beam damage to the crystals. These are being analysed by Patterson and Fourier methods. The unit cell contains two phospholipid molecules placed end to end in a similar manner to that postulated in the Davson-Danielli model for phospholipids in cell membranes. A detailed study of the molecular packing in the crystals should give indications of possible packing arrangements in cell membranes.

Studies on Viruses

Professors Siminovitch and Fuerst have continued their genetic and physiological investigations on the development of the temperate bacteriophage lambda, using absolute defective and temperature-sensitive mutants of the phage. Studies carried out with D. Mount, A. Harris, H. Eisen and L. Mayeda have provided information on the function in phage growth of several phage genes. These genes had previously been identified in other laboratories using suppressor-sensitive mutants. Five new genes, required for normal phage growth, have been identified in the course of the work and their functions partially elucidated.

Genetic studies of deletion mutants of λ and its host E. coli K12 have been carried out with Mr. D. MacQuarrie and Miss D. Paterson. Information obtained with these mutants is in complete accord with the model for prophage as proposed

by Campbell.

Investigations by Professors Siminovitch and Fuerst of an exceptional defective lysogenic strain of $K12(\lambda)$ have identified a mutation in K12 which affects the ability of cells to undergo genetic recombination. Work with this mutant and similar

isolates obtained elsewhere is being pursued in other laboratories.

Professor Axelrad and his associates have continued quantitative investigations on the process of rapid leukaemic transformation in the spleens of mice by Friend virus. The multiplication of this virus in the spleen has been shown to be controlled by a limited number, probably only a single pair, of autosomal codominant genes in the host. Since a similar phenomenon had been previously demonstrated for leukaemic focus formation in the spleen, the data suggest that a single genetically controlled host mechanism exists which operates on some process required in common for both virus multiplication and leukaemic transformation. Studies on a large number of mouse strains known to be genetically identical to one another at all but a single limited chromosome region have revealed a close association between susceptibility or resistance to Friend virus and genes controlling tissue transplantation compatability.

Mrs. S. Thomson, working with Professor Axelrad, has shown that while Friend virus itself it very insensitive to ionizing radiation, the ability of infected spleen cell suspensions to induce new leukaemic spleen foci in other mice is highly sensitive to radiation. This radiosensitive function (presumably the capacity of cells either to proliferate or to multiply the virus) is being investigated as the basis of an assay method for determining the number of cells induced by this virus to undergo leukae-

mic transformation in vivo under various conditions.

Dr. R. A. Steeves has adapted the spleen focus assay method to quantitative immunological investigation of murine leukaemia viruses, and has shown that two viruses isolated in different laboratories (Friend and Rauscher viruses) share a major antigen bound to the virus particles.

Dr. J. F. Williams and Professor Till completed a study of the radiation sensitivity of the colony-forming ability of normal and polyoma virus-transformed rat

embryo cells. Newly transformed cells and transformed cell lines which had been grown in cell culture for less than 7 weeks did not differ in their radiosensitivity from normal cells not exposed to polyoma virus. In contrast, several cell lines grown in culture for more than 35 weeks were less radiosensitive than normal cells. Irradiated cells assayed for colony-forming ability in vivo yielded results similar to those obtained for irradiated cells tested for colony-forming ability in vitro.

Professor Stanners has developed an essay system for temperature-sensitive mutants of polyoma virus, similar to that used with bacterial viruses. The assay has been applied to stocks of virus treated with different mutagenic agents and several

temperature sensitive mutants have been isolated.

Dr. R. Sheinin, with Miss P. Quinn, has continued her studies of the biochemical events which occur during the infection of animal cells by polyoma virus. It is hoped that this work will lead to an understanding of the mechanisms whereby the virus elicits a genetic transformation in the host. The DNA metabolism in infected cells is inhibited by the polyoma variant TSPI. Techniques were developed which allow the clear separation of cellular and virus DNA from an infected cell by chromatography on methylated albumin kieselguhr. It has also been established that the thymidine kinase formed in infected cells differs from the host enzyme in affinity for the substrate and in heat stability.

Effects of Radiation and Drugs on Mammalian Cells

Dr. N. Bruchovsky and Professor Till have completed an investigation of the action of phenethyl alcohol on mouse L cells proliferating in suspension cultures. This agent was found to prevent cell division, and to inhibit the initiation and completion of DNA synthesis. It also caused a temporary depression in the incorporation of labelled precursors into RNA and protein, and a transient decay of polyribosomes with a concomitant increase in single ribosomes. Cells inhibited with phenethyl alcohol over a 12-day period retained their capacity to proliferate after

removal of the agent.

Professor Whitmore in collaboration with Mr. J. Borsa is carrying out a study on the effects of Methotrexate on mammalian cells in vitro. These studies have shown that Methotrexate inhibits the production of thymidine, purines and certain amino acids and that these effects can ultimately bring about the death of mammalian cells. From the studies it would appear that the principal toxic effect of the compound is manifest when thymidine synthesis is inhibited but the synthesis of purines and amino acids proceeds uninhibited. Under these conditions cells die rapidly and it would appear that death is due to unbalanced synthesis. In this respect the phenomenon is similar to "thymineless death" in bacteria. In addition to the in vitro studies an assay has been developed for the presence of Methotrexate in mammalian serum and this technique is being used in both clinical and laboratory studies.

Professor Bruce has continued his studies of the action of chemotherapeutic agents on normal hematopoietic and lymphoma stem cells in vivo. The importance of rate of proliferation on the sensitivity of these cells to vinblastine and 5-fluorouracil has been demonstrated in experiments carried out with Mr. F. A. Valeriote. These studies show that the sensitivity of the marrow cell, which is normally much less than that of the lymphoma cell, approaches that of this malignant cell when the normal cell is proliferating rapidly and repopulating the marrow space. Dr. H. Madoc-Jones with Professor Bruce has demonstrated that the sensitivity of mouse L cells in tissue culture to 5-fluorouracil similarly depends on the proliferative state of these cells. The action of a number of other chemotherapeutic agents is being examined with

this system.

Professor Bruce has aided Professor R. B. Painter of the Connaught Medical Research Laboratories in the preparation of large quantities of a concentrate of erythropoietic stimulating factor from the plasma of anaemic sheep. This material will

be available from the Laboratories for investigators interested in the action of the hormone in erythropoiesis.

Studies on Blood-forming Cells

Professors Till, McCulloch and Siminovitch have continued their studies of normal control mechanisms affecting cellular proliferation and differentiation. In studies of haemopoiesis, the spleen-colony method is used both to assay for haemopoietic stem cells and to obtain clonal populations derived from these cells. In collaboration with Dr. J. H. Fowler, a large number of such clones have been analysed for their content of granulopoietic and erythropoietic cells as well as new haemopoietic colony-forming cells. All three cell types were found in a majority of the clones examined, giving support to the view that colony-forming stem cells give rise to more than one kind of differentiated cell. However, no close correlation was found between the growth of colony-forming cells and either differentiated pathway, indicating that various subpopulations within a single clone might be controlled independently of each other. Support for this hypothesis was obtained from two other series of experiments. In the first, it was found that suppression of erythropoiesis by transfusion had little effect on the doubling time of colony-forming cells growing following transplantation in unirradiated mice of genotype W/W^{v} . In the second, a genetic defect at the f locus was found to cause a marked early defect in erythropoiesis without affecting either granulopoiesis or the growth of colony-forming cells.

Studies of proliferation and differentiation in the immune system have continued in collaboration with Dr. J. C. Kennedy and Dr. R. A. Phillips. Some properties of the cells which respond to antigenic stimulation by sheep erythrocytes have been determined. Approximately 10³ such cells are present in normal mouse spleen, and these respond to the antigen by undergoing 4–8 cell divisions, giving rise to haemolysin-

producing progency.

In collaboration with Mr. R. Turner physical methods of cell separation are being studied. Using a Bovine Serum Albumen gradient, a 25-fold enrichment of cells with colony-forming ability has been achieved.

Immunological Studies

Professor Cinader in collaboration with Dr. Chi-Tao Chou and Dr. S. Dubiski has studied immunoglobulin-chimaerism in rabbits which have received, at birth, cells from spleen, thymus, lymph node or from peritoneal exudates. The products of these transferred cells could be followed by virtue of genetic markers (allotypes), the donors being so chosen as to differ in these markers from the recipient animals. Up to 20 per cent of the animals injected with thymus cells became chimaeric in that they produced immunoglobulins which carried the marker of the donor for the entire observation period of 3–4 months. The concentration of donor-immunoglobulin was comparable to that found in animals which are naturally heterozygous with

respect to the marker.

The antigen, MuBl, originally discovered in mice, has now been shown to be present in the serum of most mammals, including man, and to be the C5 component of complement. In collaboration with Dr. Dubiski, it has been shown that the quantity of MuBl in the circulation of an animal follows precise dosage laws so that an animal possessing two gene copies makes exactly twice as much of this component as an animal which possesses only one gene copy. In collaboration with Dr. Urbach, the hormonal control of MuBl has been studied and it has been found that castration of the male reduced its normally high concentration to the same level as is normally found in the female. The serum-concentration of MuBl can be increased by administration of testosterone. The role of oestrogen and progesterone has also been investigated.

Dr. Cinader had proposed a "steering mechanism" for the regulation of the inheritance of the antibody response in 1961. Since the production of MuBl is under

the control of a single gene, it has become possible to test this hypothesis. From the hypothesis it could be predicted that the inheritance of the ability to make antibody to MuBl would be under the control of a single gene and would appear to be

recessive. Experimental results are in full agreement with this prediction.

Studies on the breakdown of acquired immunological tolerance by cross-reacting antigens are being continued. The effects of the nature and the number of chemical groups in the cross-reacting antigen on the frequency of tolerance breakdown are being examined in collaboration with Dr. K. Konishi and Mr. J. St. Rose. These experiments are relevant to a current clinical experiment aimed at inducing antibody to autologous tumour tissue by immunization with chemically altered tumour cells; this study was started in collaboration with Dr. D. M. Whitelaw and is being continued with Dr. J. W. Meakin. So far, 78 patients have been entered into the study.

Biochemical Studies

Professor Fraser in collaboration with Dr. K. Hosokawa and with Mr. Bouchard have continued their studies on the development of an *in vitro* system for the biosynthesis of amino acid acceptor RNA. The methods involve attempts to isolate the small portion of the genome (DNA) of mouse Ehrlich ascites carcinoma cells which directs the synthesis of the RNA *in vivo*. The isolated DNA has been used to make RNA in the presence of nucleoside triphosphates and E. coli RNA-polymerase. In recent months particular attention has been directed towards improving and "scaling up" the purification procedures so that the properties of the DNA itself may be examined. The techniques will be applicable to the isolation of any part of the genome for which a "complementary" RNA is available. Theoretically they could be applied to isolate a single gene.

Professor Fraser is continuing his studies of mammalian amino acid-activating enzymes. Two enzymes in rat liver which activate glutamic acid have been partially resolved. Both catalyse glutamate-dependent ATP-³²PP exchange and glutamyl-RNA formation. One has a pH optimum of 5.5, the other a pH optimum of 7.4. Both enzymes are very sensitive to the action of ribonuclease. There is some evidence that a low molecular weight RNA fraction is involved not only in maintaining the structural integrity of these enzymes, but also in exerting some allosteric control on the first

step of the amino acid activation process.

With Mr. R. W. Reader and Professor Howatson, Professor Stanners has studied the state of ribosomes not participating in protein synthesis, in extracts of a variety of mamalian cell types. Under certain conditions the inactive ribosomes from hamster or rat cells were found to exist solely as dimers, while those from human or mouse cells existed solely as monomers. This state of the ribosomes was independent of the degree of differentiation, the presence or absence of malignant transformation or the growth *in vitro* of the source cells, and was correlated only with the species. Preliminary evidence favoured the existence of ribosome monomers within whole cells of any source.

Professor Stanners with Mr. J. M. Taylor has studied the effect of the aminonucleoside of puromycin on hamster embryo cells grown in vitro. The drug was shown to have no effect on cellular protein synthesis but to depress severely the synthesis of ribosomal RNA. The RNA synthesized in the presence of the drug was found to have two properties characteristic of messenger RNA: a heterogeneous

sedimentation coefficient and a high instability.

Professor Stanners has studied the incorporation of labelled amino acids into nascent protein on the cytoplasmic polysomes of hamster cells grown in vitro. A mathematical analysis of the process allowed several independent estimates of the time required for the synthesis of a complete polypeptide chain of average length. The independent estimates agreed with one another giving a value of approximately 25 seconds; this agreement supported the model of the polysomes embodied in the mathematical analysis.

Clinical Physics Applied to Radiodiagnosis and Radiotherapy

Professor Cunningham in collaboration with Dr. J. Wright and K. C. Tsien of Temple University Hospital, Philadelphia, has completed an atlas of radiation distributions for rotation therapy. This project was undertaken in collaboration with the International Atomic Energy Agency, Vienna.

Professor Cunningham with Mr. B. Holmes is developing a clinical dosemeter

for the direct measurement of absorbed dose.

Professor Aspin and Professor Sass-Kortsak continued their studies on the uptake and distribution of radioactive copper in members of families with Wilson's disease. They have initiated investigations of the rate of intestinal absorption of copper in these cases.

Professor Aspin and Dr. Swyer are continuing their investigations of regional lung function using radioactive zenon and the scintillation camera.

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MEDICINE

Under the direction of Professor K. J. R. Wightman

The past year seems largely to have been devoted to planning—at all levels and in many contexts. We are very grateful to all the members of the Department who have devoted so much time, energy and thought to these activities, and particularly to Dr. E. R. Yendt and Dr. J. C. Laidlaw whose work on departmental, university

and hospital committees has been outstanding.

At all the hospitals, changes which affect our Department are in various stages of completion. The Wellesley Hospital is on the point of opening its new units which will provide much-needed space for research and clinical investigation in the fields of rheumatism, endocrinology and dermatology. The main treatment centre for arthritic patients will be at this hospital. The Toronto Western Hospital is well advanced in planning for a Medical Sciences building which will provide teaching, research and office space, as well as special facilities for the treatment of patients (such as a Respiratory Failure Unit). The New Mount Sinai Hospital is hoping to expand the medical unit to 200 beds, with additional laboratory space, a clinical investigation unit and an intensive care area. The Women's College Hospital has begun work on a new wing which will include a unit and day care centre for diabetic patients, among other things. An expansion of the medical unit at the Princess Margaret Hospital is also occurring. At St. Michael's Hospital a new building includes handsome quarters for isotope and cardiovascular investigation and a new lecture theatre. Further research space is anticipated eagerly. At the Toronto General Hospital the renovation of the Outpatient Department has just been completed. This is an area of tremendous importance in teaching in the Department of Medicine. Laboratory space is being found at the Spadina Division of the Connaught Laboratories and a major planning effort is under way to provide the research space which is so badly needed. Recruiting of new members of the Department has had to be done in advance of the provision of new facilities, and we are very grateful for the interim facilities which have been provided in various ways through the University.

In seeking new men we have had to be aware of new needs in teaching, patient care and research and have striven for a balance between the skills needed in all these areas. The Department cannot be made up entirely of research men nor can it consist solely of pragmatic practitioners. Matters of personality and character must be weighed in the balance with special skills in research and clinical medicine, for the object of the exercise is to assemble a group of men capable of influencing young people in a way which we speak of as "teaching," and who can work together in an orderly fashion, spoken of as "administration." In this recruiting effort we have been encouraged to find that men are willing to invest themselves in our future, but the limiting factors are laboratory space and equipment. We have been greatly en-

couraged by the added funds given to us for new salaries.

Undergraduate Teaching

The staff of the Women's College Hospital have undertaken the teaching of fourth year students for the first time. A special outpatient clinic incorporating three general practitioners has been set up under the leadership of Dr. Jean Davey. A similar venture is under way at the New Mount Sinai Hospital. These may well prove to be the forerunners of similar operations at our larger hospitals. The experiment in student internship at the Wellesley Hospital continues to be popular with both students and staff. The second year programme at the Toronto Western Hospital suddenly felt the impact of a much increased enrolment but carried on successfully. At the Toronto General Hospital some experimental approaches to second year teaching have been carried out by Dr. L. F. W. Loach, and in the fourth year programme Drs. Loach, C. K. Gorman, J. E. Morch and J. K. Davidson have

conducted exercises in applied basic sciences. We have read with interest the student appraisal of the course. A good deal of thinking is being done about means of

preserving teaching wards and outpatient clinics in the Medicare situation.

The postgraduate activities in the Department have involved participation in various courses arranged through the aegis of the Postgraduate Division and numerous visits and lectures in other universities and communities. An interdisciplinary course on "Basic Mechanisms in Medicine" was arranged for the American College of Physicians which was very successful. The intramural training programme involves approximately forty residents and assistant residents, and a slightly smaller number of Fellows in the special disciplines.

In the service area the main feature seems to be the development of special units for the treatment of patients with acute coronary thrombosis, respiratory failure, renal failure and new diagnostic facilities using radioactive isotopes. The use of monitoring equipment and the concept of intensive care units is gradually applying to a wider and wider group of patients. In some ways this complicates the problems

of undergraduate and postgraduate teaching.

STAFF

We are very sad to report the loss of many members of our Department to other universities. The appointment of Dr. John Evans as Dean of the new Faculty of Medicine at McMaster University was referred to last year. Since then Dr. W. B. Spaulding and Dr. J. F. Mustard have elected to join him. Dr. Ramsay Gunton has been appointed Professor of Medicine at the University of Western Ontario. Dr. J. A. Dauphinee, who was appointed in the Department of Medicine approximately thirty years ago and has maintained a connection with it ever since, has reached retirement age as far as the Hospital and Department of Medicine are concerned and we are most grateful to him for all he has contributed to the Department in the past years.

We are happy to congratulate Dr. John Paterson in his appointment as Chief of Medicine at Sunnybrook Hospital. The development of this teaching unit will be watched with great interest. Dr. Allan Walters has decided to relinquish his position as Head of the Psychiatric Unit in the Toronto General Hospital. He has expended many long hours of planning and writing briefs to point out the future needs of psychiatry in that Hospital. This will have undoubted relevance to other hospital plans, especially in view of the new responsibilities for psychiatric teaching to be carried by the general hospital in the future. We are tremendously grateful to him

for his work.

We have also been tremendously helped by the activities of Mr. W. Oxley, the new Business Officer of the Department. He has taken over a great deal of the administrative load, particularly as it involves the financial side of the Department. I also appreciate greatly the administrative assistance of Dr. C. R. Burton and the secretarial staff of the Department. As in the past it must be acknowledged that the whole success of the year's work has depended on the degree of co-operation given by the members of the Department.

Visitors to the Department included Dr. D. E. Christian, Kingston, Jamaica; Professor R. R. A. Coombs, Cambridge, England; Dr. James Crooks, Aberdeen, Scotland; Dr. J. N. Cumings, London, England; Dr. Anatole Dekaban, Washington; Dr. E. R. Giblett, Seattle, Washington; Professor J. P. Hoet, Louvain, Belgium; Dr. L. Horlick, Saskatoon, Saskatchewan; Professor J. D. Hunter, Dunedin, New Zealand; Dr. B. W. Johannson, Sweden; Dr. J. R. Drevans, Baltimore, Maryland; Professor S. M. Misra, Bhopal, India; Professor P. L. Mollison, London, England; Dr. Salvator Pahua, Mexico City; Dr. Graeme Sloman, Melbourne, Australia.

SCHOLARLY ADDRESSES

Dr. H. J. M. BARNETT, Annual Clinic Day, Academy of Medicine, London, Ontario; Third Annual International Conference on Spinal Cord Injuries. Dr. R.

BAUMAL, Federation of American Societies for Experimental Biology, Atlantic City, New Jersey; Canadian Society for Clinical Investigation, Montreal; Ontario Antibody Club; Toronto Society for Clinical Investigation. Dr. D. S. Beanlands, Canadian Cardiovascular Society, Toronto; Canadian Cardiovascular Society, Winnipeg; American College of Physicians, Toronto. Dr. D. E. Bergsagel, Manitoba Medical Association, Winnipeg; American College of Physicians, Toronto; American College of Physicians and Surgeons, New York; Ontario Medical Association, Toronto. Dr. B. Berris, Medical Alumni Course, Toronto. Dr. J. R. Bingham, Manitoba Medical Association, annual meeting, Winnipeg. Dr. I. Broder, American College of Physicians, Toronto; Buffalo Allergy Society, Buffalo; State University, New York, Buffalo; Canadian Society of Clinical Investigation, Montreal; American Academy of Allergy, New York; Eleventh International Congress of Rheumatology, Mar del Plata, Argentina; Third International Pharmacological Congress, Sao Paulo, Brazil; Canadian Academy of Allergy, Toronto. Dr. K. W. G. Brown, American Heart Association, Miami. Dr. W. R. Bruce, American College of Physicians, Toronto; University of Chicago, Chicago.

Dr. M. Cohanim, 78th annual meeting of the American Clinical and Climatological Association, Williamsburg, Virginia. Dr. J. S. Crawford, Ontario Medical Association, general meeting, Toronto. Dr. J. H. Crookston, University of Toronto Extension Course in Pharmacy, Toronto; American College of Physicians, Toronto; Ontario Antibody Club; American Society of Haematology, annual meeting, Philadelphia; Michigan Association of Blood Banks, annual meeting, Detroit. Dr. G. A. DeVeber, Burlington Medical Society. Dr. J. W. Digby, Smiths Falls Medical Society. Dr. S. Dubiski, Antibody Workshop, Rehovoth, Israel; State University of Kansas, Manhattan, Kansas. Dr. J. R. Evans, Canadian Society for Clinical Investigation, Ottawa; University of Western Ontario; Royal College of Physicians and Surgeons of Canada, annual meeting, Montreal; American College of Physicians, Toronto. Dr. C. Ezrin, College of Physicians and Surgeons of Saskatchewan; Montefiore Hospital, New York Medical Center; University of Saskatchewan; Hamilton

Academy of Medicine; University of Cincinnati.

Dr. J. M. Finlay, Royal College of Physicians and Surgeons, Montreal; Society of Clinical Chemists of Canada, Winnipeg. Dr. J. D. L. FITZGERALD, Canadian Academy of Allergy, Ottawa; American Academy of Allergy, New York; Society for Clinical Investigation, Toronto. Dr. W. H. Francombe, Ontario Antibody Club; American Society of Haematology, annual meeting, Philadelphia. Dr. R. J. A. GAGNÉ, 78th annual meeting of the American Clinical and Climatological Association, Williamsburg, Virginia; Laval University, Quebec City. Dr. D. A. Gordon, Sudbury and District Medical Society, Sudbury; Clinical Research Society of Toronto; Halton County Medical Society, Oakville; Conference in Rheumatic Diseases, Mar del Plata, Argentina; Canadian Rheumatism Association, annual meeting, Edmonton. Dr. C. C. Gray, Regional General Practice Meeting for Maritimes, Charlottetown; Ontario Thoracic Society, Toronto; Ontario TBC Association, annual meeting, Toronto; Association of Nursing Homes, annual meeting, Toronto; Wellington County Health and Tuberculosis Society, annual meeting, Guelph. Dr. R. W. Gunton, American College of Physicians, Toronto; Dr. J. Harrison, Canadian Society for Clinical Investigation, Montreal.

Dr. R. I. Hector, Ontario Medical Association, Sudbury; Ontario Medical Association, annual meeting; Dental Technicians' Association, annual meeting, Toronto. Dr. R. Herst, American Society of Haematology, annual meeting, Toronto. Dr. C. Hetenyi, Clinical Research Society of Toronto. Dr. H. P. Higgins, Brampton Medical Society; International Goitre Conference, Rome, Italy. Dr. J. B. Houpt, American Rheumatism Association, Philadelphia; Canadian Hospital Pharmacists Association, Ontario Division. Dr. O. Kofman, Canadian Neurological Society, New York. Dr. J. C. Laidlaw, American College of Physicians, Toronto; American Clinical and Climatological Association, annual meeting, Williamsburg, Virginia; Hamilton Academy of Medicine; Second International Congress on Hormonal

Steroids, Milan, Italy. Dr. J. A. LITTLE, Queen's University, Kingston; Canadian Society for Clinical Investigation, Montreal; Toronto Diabetes Society, Toronto; Canadian Life Insurance Medical Officers Association, annual meeting, Toronto; American College of Physicians, Toronto. Dr. L. F. W. LOACH, American College of

Physicians, Toronto.

Dr. I. Macdonald, North Bay Medical Society; Canadian Conference on Aging, Toronto. Dr. R. L. MacMillan, American Heart Association, Miami. Dr. J. T. Marotta, Canadian Neurological Meeting, New York. Dr. E. A. McCulloch, American College of Physicians, Toronto; 57th annual meeting, American Association for Cancer Research, Denver; Medical Division of Brookhaven National Lab, Upton, L.I., New York; University of Chicago; Rosewell Park Memorial Institute, Buffalo; Medical Alumni Association, Toronto; Queen's University, Kingston; 20th annual meeting, Western Regional Group Medical Research Council and National Cancer Institute of Canada, Suffield Experimental Station, Ralston, Alberta. Dr. W. J. McIlroy, Kinsmans Club, Peterborough; Niagara Chapter, Multiple Sclerosis Society of Canada. Dr. D. J. MacKenzie, American College of Physicians, Toronto. Dr. J. W. Meakin, American College of Physicians, Toronto; Nurses Association, Sault Ste. Marie, Ontario; Eleventh Annual Cancer Symposium, Regina, Saskatchewan.

Dr. J. E. Morch, Royal College of Physicians and Surgeons, Montreal; American Society for Clinical Investigation, Atlantic City, Dr. J. F. Mustard, American College of Physicians, Toronto; Symposium on Some Aspects of Pathogenesis and Treatment of Thrombo-embolic Disease, Basle; Council on Arteriosclerosis of the American Heart Association, Bar Harbor, Florida; Canadian Heart Foundation, 9th annual meeting, Winnipeg; American Society of Haematology, Philadelphia; Canadian Society for Clinical Investigation, Montreal; Fourteenth Annual Symposium on Blood, Wayne State University; Symposium on Vascular Disease, Philadelphia; Federation of European Biochemical Societies, Warsaw, Poland; Federation of American Societies for Experimental Biology, Atlantic City; American Society for Clinical Investigation, Atlantic City; International Symposium on Recent Advances in Atherosclerosis, Athens; Tenth National Medicinal Chemistry Symposium, Indiana.

Dr. M. A. Ogryzlo, WHO Conference on Education in Rheumatology, Mar del Plata, Argentina; XI International Congress on Rheumatic Diseases, Mar del Plata, Argentina; Canadian Pharmaceutical Medical Officers Association, Ste. Adele, Quebec; Canadian Life Insurance Medical Officers Association, Toronto; American College of Physicians, Toronto; Maisonneuve Hospital, Montreal; Canadian Hemophilia Society, Toronto; Heberden Society, London, England, Symposium on Allopurinol; Canadian Rheumatism Association, Edmonton. Dr. R. Pos, Osler Society, Toronto; J. E. Purkinje Medical Society, Psychiatric Clinic, Prague, Czechoslovakia. Dr. E. J. Prokipchuk, Toronto Council on Alcoholism, Toronto. Dr. A. Rapoport, American College of Physicians, Miami; Canadian Cardiovascular Society, Winnipeg; Canadian Society for Clinical Investigation, Montreal; American College of Physicians, New York. Dr. J. C. Richardson, Saskatchewan College of Physicians and Surgeons, Saskatchewan. Dr. R. Schachter, Jerusalem Medical Society.

Dr. D. L. Schatz, Royal College of Physicians and Surgeons of Canada, Montreal. Dr. R. H. Sheppard, Royal College of Physicians and Surgeons of Canada, Montreal. Dr. H. Smythe, Conference in Rheumatic Diseases, Mar del Plata, Argentina. Dr. W. B. Spaulding, Bruce County Medical Society, Paisley, Ontario. Dr. J. L. Ruse, Sixth Pan American Congress of Endocrinology, Mexico City. Dr. M. B. Urowitz, Canadian Rheumatism Society, Edmonton; Clinical Research Society, Toronto. Dr. R. Volpé, Royal College of Physicians and Surgeons of Canada, Mont-

real; American College of Physicians, Toronto.

Dr. P. G. Walfish, Royal College of Physicians and Surgeons of Canada, Montreal. Dr. J. A. Walters, American Psychosomatic Society, Chicago. Dr. K. J. R. Wightman, Annual Refresher Course, Dalhousie University; Atlantic Provinces Dietetic Association; Canadian Association of Consumers; Ontario Medical Associa-

tion, Toronto; Conference on Residency Training, Kingston; Ontario Thoracic Society; American College of Physicians, Toronto. Dr. E. D. Wigle, Department of Medicine, Dalhousie University, Halifax; Nova Scotia Cardiovascular Society, Halifax; Clinical Day, St. John, New Brunswick; 38th Scientific Sessions of the American Heart Association, Miami Beach, Florida; 18th annual meeting, Canadian Cardiovascular Society, Winnipeg; Canadian Society for Clinical Investigation, Montreal; Joint Meeting, Section of Cardiology, Ontario Medical Association and Western New York Heart Association, Toronto; Meeting of American Society of Thoracic and Cardiovascular Surgery, Vancouver; American College of Physicians, Toronto. Dr. C. R. Woolf, Southern Thoracic Society, New Orleans; Ontario Thoracic Society; Sudbury Medical Association, Sudbury; University of Western Ontario, London; Canadian Society of Clinical Investigation, Montreal; Queen's University, Kingston; Ontario Medical Association annual meeting, Toronto; British Columbia Thoracic Society, Vancouver; Canadian Academy of Allergy, Toronto; Royal College of Physicians and Surgeons, annual meeting, Montreal; Halton County Medical Association, Oakville. Dr. E. R. YENDT, Royal College of Physicians and Surgeons of Canada, Montreal; 78th annual meeting of the American Clinical and Climatological Association, Williamsburg, Virginia.

RESEARCH

Allergy-Immunology

Dr. I. Broder and Dr. R. Baumal at the Toronto Western Hospital have discovered a biologically active material in serum and synovial fluid of patients with rheumatoid arthritis which behaves in some ways like an antigen-antibody complex. The nature of the interaction between soluble antigen-antibody complexes and tissue, in anaphylactic activation, is under continued study. Dr. S. Dubiski, also at the Western Hospital, is studying the structure and synthesis of immunoglobulins and antibodies. Certain other aspects of immunology are mentioned in relation to the neoplastic diseases and the renal transplant problem.

Cardiovascular

Dr. H. E. Aldridge is reviewing patients who have had internal mammary artery transplant, and a series of patients who have had operations for atrial septal defects in the preceding years. Dr. Donald S. Beanlands at the Toronto Western Hospital is studying the Angiotension infusion as a diagnostic tool in the study of renal vascular hypertension. He is also measuring the effect of heart rate and atrial contraction on cardiovascular dynamics and conducting an assessment of a new diuretic. Drs. K. W. G. Brown and R. L. MacMillan at the Toronto General Hospital have been working in the Coronary Unit to determine the cause of the early mortality of cardiac infarction and to see what can be done to influence the incidence of cardiac arrhythmias. At the same time studies in red blood cell preservation and platelet function have been carried out by Dr. MacMillan. Dr. L. Casella and Dr. P. Forbath at St. Michael's Hospital have been working in their new haemodynamic unit. They have also been experimenting with phonocardiographic recordings of heart sounds and using them as a teaching aid. With Dr. D. C. Finlayson they are studying the effect of low molecular weight dextran in shock. Dr. H. Fields has also taken part in this study. Dr. W. F. Greenwood has reviewed forty patients who were operated upon for mitral stenosis during pregnancy at the Toronto General Hospital. Dr. A. J. Kerwin of the Toronto Western Hospital is assessing the value of continuously recorded cardiograms in a search for transient arrhythmias. Dr. J. E. Morch at the Toronto General Hospital is learning how to use radioactive Xenon in the evaluation of mitral insufficiency. A follow-up of ventricular septal defect patients is being conducted. The preliminary design of a project in teaching of cardiology in conjunction with the Institute of Education Research is being drawn up.

Dr. E. D. Wigle reports expansion of new facilities in the Cardiovascular Unit at the Toronto General Hospital. He has carried out further investigation of the pathophysiology of muscular subaortic stenosis, sudden severe mitral insufficiency, diastolic mitral insufficiency and certain unusual types of large vessel disease. Dr. J. K. Wilson at St. Michael's Hospital has been particularly interested in cardioversion, and has participated in the other activities of the cardiac department in the hospital.

Dermatology

Dr. H. C. Hair and Dr. H. Haberman at the Toronto Western Hospital have been doing research on the solubility of proteins in psoriatic scales and the immunologic aspects of melanoma. The changes in the skin with aging have also been studied. Dr. M. G. Williams at the Wellesley Hospital and the Princess Margaret Hospital has been studying virus and immunologic reaction in various skin diseases. Dr. A. L. Hudson has been testing fluorinated steroids and also using topical oxygen therapy in chronic leg ulcers. The Dermatology staff as a group are building up a postgraduate training programme.

Endocrinology

Dr. C. Ezrin, at the Toronto General Hospital, is studying the transfer rate of labelled T4 and T3 in patients with various kinds of thyroid disease. He is also collaborating with the Department of Pharmacology in the study of TSH and Long Acting Thyroid Stimulant in patients with Graves' disease, before and after treatment with radioactive iodine. Dr. H. P. Higgins at St. Michael's Hospital is studying non-toxic goitre and thyroiditis. They are giving intravenous thyroxine and triiodothyronine to patients with deficient thyroxine binding globulin and comparing the effects with normal. Dr. J. C. Laidlaw at the Toronto General Hospital, in association with Dr. D. J. A. Sutherland and Dr. T. Chremos, has been studying the physiological role of corticosterone. A new syndrome, resembling primary aldosternism but responding to dexamethasone, has been described. The mechanism of action of heparin-like compounds on the adrenal cortex is also being investigated. Dr. J. L. Ruse is investigating the metabolism of 16a-hydroxylated steroids. Dr. R. H. Sheppard, Dr. D. L. Schatz and Dr. M. H. Jafri at the Toronto Western Hospital are studying thyroid binding proteins in patients with heart disease before and after surgery, and in obese patients on starvation therapy. The metabolism of calcium in hypothyroidism and the effect of potassium repletion on intravenous glucose tolerance test is also under study. Dr. Sheppard has been particularly interested in the thickness of skin in various endocrine disorders and has collaborated in the thyroid function study.

Gastroenterology

Dr. J. R. Bingham, in association with Dr. A. V. Aynaciyan, is using a telemetric technique to measure duodenal acidity and studying the effects of various drugs on gastric secretion and gastric emptying. Extensive support for the development of gastroenterology research unit at the Toronto Western Hospital has been forthcoming from a private donor. Dr. L. J. Cole of the New Mount Sinai Hospital is studying various diagnostic procedures in pancreatic disease, gastroscopy in the early diagnosis of gastric cancer and hypothermia in the treatment of massive upper gastrointestinal hemorrhage. At the Toronto General Hospital, Dr. J. Finlay has initiated the study of gastric juice protein and has continued the studies with Dr. Joan Harrison and Professor K. McNeill (Department of Physics) on calcium metabolism, using radioisotope methods. A method of determination of low concentrations of calcium in urine has been worked out by Mr. A. J. Hitchman. At St. Michael's Hospital Dr. E. J. Prokipchuk has been surveying the behaviour of medium length chain triglycerides in malabsorption and protein-losing enteropathy.

Haematology and Cancer Research

Dr. Ruth Alison (PMH) is continuing a comparative study of the chemotherapy of Hodgkin's disease and another trial of treatment of lymphocytic leukaemia and lymphosarcoma. Dr. C. J. Bardawill (SMH) is continuing the study of 17-ketosteroid fractions in the urine of patients with leukaemia and hormone-dependent tumours. He is also studying enzyme activities in a variety of neoplastic and other disorders. Dr. D. E. Bergsagel (PMH) is attempting to correlate the prognosis and response to treatment in multiple myeloma with the type of immunoglobulin found in the serum. The urinary excretion of melphalan in patients with plasma cell myeloma has been measured. An attempt has been made to work out the optimal therapy with methotrexate in various types of malignancy. A similar study of cyclophosphamide has been carried out. A series of patients has been treated with a combination of agents in acute leukaemia. A trial of mithramycin therapy has also been instituted. Dr. Alan Bruce-Robertson (PMH) continues the study of protein metabolism during acute radiation sickness and studies of various types of abnormal serum protein encountered in patients at the hospital. Dr. K. R. Butler (SMH) has begun work with immuno-electrophoresis. Dr. D. H. Cowan (TGH) has carried out a series of drug trails in solid tumours and leukaemia patients and is studying lymphocyte transformation in patients with leukaemia and malignant disorder. Dr. J. H. Crookston (TGH) with Dr. M. A. Hooey is continuing a study of patients with myeloproliferative thrombocythaemia. The study of haemoglobinopathies continues in association with Dr. Ng and with the Department of Ophthalmology. With Dr. Roslyn Herst a study of platelet function is going on and the effectiveness of anti-haemophilic globulin is being assessed. Coagulation defects in patients undergoing heart surgery and their response to heparin are being investigated. Collaborative investigations with the Hospital for Sick Children and members of the Department of Medicine, University of Rochester, have been concerned with chromosomal deviation, antibodies to intrinsic factor and components of red cell auto-antibodies and iso-antibodies. Two patients with a type of congenital dyserythropoietic anaemia have been described, and two new abnormal haemoglobins have been characterized. Dr. H. Goldenberg (NMSH) has analysed twenty cases of erythremic myelosis and preleukaemia. Dr. R. Hasselback (PMH) has begun the use of a "Sterile island" procedure for intensive chemotherapy in acute leukaemia. Trials of various drugs in malignant disease continue and the use of platelet concentrates in patients with severe thrombocytopoenia. Dr. D. Ley (TWH) in association with Dr. David Howse and Dr. Sekiguchi have studied serum proteins of various types in patients with malignant disease, iron metabolism in cancer, platelet survival in cancer and heart surgery, lymphocyte cultures for histocompatilibility testing, and bone marrow culture as an indication of drug sensitivity. Dr. H. Meindok, also at TWH, is conducting a series of trials of various drugs in a wide range of tumours. Dr. E. A. McCulloch (TGH and Department of Medical Biophysics) has continued the study of stem cells and the dynamics of cell proliferation in the haemopoietic system. Dr. J. W. Meakin (PMH) in co-operation with Dr. B. Cinader is testing the effect of immunization of cancer patients with diazotized extracts of their tumour. A study of the effect of ovarian irradiation and prednisone following mastectomy in carcinoma of the breast is being carried out as well as a series of trials of chemotherapy.

Radioisotope studies at the various hospitals include some of the techniques already mentioned with respect to platelet survival, iron metabolism, etc. The study of calcium and strontium metabolism is being carried out by Dr. J. E. Harrison at TGH. The use of sodium alginate to reduce gastrointestinal absorption of radio-strontium is being investigated. Measurements of the body burden of thorium are being carried out. Cesium levels are being studied in normal people in Toronto and from areas surrounding the sites of future nuclear power stations, Dr. D. Wood is developing a battery of new methods for the radioisotope investigation of patients.

Metabolism and Diabetes

Dr. M. A. Chiong, in association with Dr. Evans and Dr. Sanbar (TGH) reports on the effects of hypoxia on carbohydrate metabolism of the isolated perfused rat heart and on the effects of diazoxide on carbohydrate metabolism in the same preparation. The effects of thiamine pyrophosphate have also been measured. Dr. N. Forbath (TGH) working in collaboration with Dr. Hetenyi in the Department of Physiology and others has been studying the behaviour of radioactive glucose and lactate turnover. A diabetes data handling project is also under way. Dr. C. K. Gorman (TGH) is setting up a radio-immuno-assay for glucagon. Dr. Alick Little (SMH and Sunnybrook) is investigating the effects of diet, particularly of coffee on serum lipids. The effect of different monosaccharides and polysaccharides on blood glucose levels in diabetes and hypoglycaemic patients has been investigated. A patient with fructosaemia has been investigated and found to have a platelet abnormality producing venous thrombi, owing to the absence of an ADP-ase system. A study of the effects of diet on serum lipid levels in hyperlipidemic patients has been carried out. In the absence of sucrose, cholesterol seems to exert little effect. Dr. P. G. Walfish (NMSH) has administered diazoxide to two patients with insulinoma, controlling their low blood sugar. Techniques are being established with a differential diagnosis of the various types of hyperlipoproteinemic syndromes. Work is being done with d-thyroxine. Dr. S. S. Sanbar (TGH) is studying the interrelationships of fatty acids, amino acids and carbohydrate metabolism. A variety of techniques are being used. The specific effects of octanoate, L-leucine and diazoxide have been worked out in isolated organ preparations and dogs.

Neurology

Dr. J. M. Barnett (TGH), with Dr. M. Hill has investigated low pressure communicating hydrocephalus as a curable cause of dementia. Dr. J. G. Humphrey (TGH) is doing histochemical work in muscle biopsies, metabolic studies on hyperkalaemic and hypokalaemic periodic paralysis, motor nerve conduction studies and

investigations with myasthenia gravis.

Dr. W. J. McIlroy (TWH) has completed a clinical review of multiple sclerosis patients which has been going on for some years. Dr. J. T. Marotta (SMH) has been investigating the use of Tegretol in Tic Douloureux. Dr. J. C. Richardson with Dr. J. Steele has conducted an investigation of progressive supranuclear palsy and with Dr. Marion Hill has initiated an extensive survey of the Toronto General Hospital experience with Parkinsonism and other basil ganglion diseases. Dr. Bruce Stewart (SMH) is developing a programme to study regional total cerebral blood flow and the effects of depressant drugs on oxygen consumption of the brain. Dr. J. R. Wherrett (TGH) is continuing his studies of the glycolipids in diseases of the nervous system. Patients with gargoylism have been studied and found to excrete abnormal lipids in the urine. With Dr. W. E. Martin study of blood cell glycolipids has been carried out.

Psychiatry

Dr. E. F. W. Baker (TWH) is measuring sodium transfer across the blood brain barrier, to see if it is disturbed in patients with depressive states. Dr. R. Ian Hector (TGH) is looking into psychological factors in obesity and developing a technique for "behaviour therapy" of obese patients. He is also comparing the value of Diazepan and Tranylcypromine in depressive states. Dr. Robert Pos (TGH) is carrying on a major research into the electrophysiology of informational underload (sensory deprivation). This is largely a matter of animal experimentation and new techniques are being devised not only to obtain data but also to process these various new types of computer. Dr. Pos is working in collaboration with Dr. R. Tasker of the Department of Surgery, as well as members of the Department of Biomedical Engineering.

Dr. A. J. Preston (TWH) has investigated a variety of problems in collaboration with other members of the staff at that hospital.

Renal Disease

Dr. W. T. W. Clarke (TGH) is studying the application of chronic dialysis therapy in patients with severe renal failure. At the Toronto Western Hospital Drs. H. Coopersmith, M. Johnson, G. A. DeVeber and A. Rapoport are carrying out a battery of investigations which include study of acid excretions in patients with uric acid calculi, a comparison of creatinine and inulin clearances, the effects of unilateral renal artery stenosis on kidney function in the dog. A chronic renal dialysis and renal transplant programme is being organized. Studies of immunoglobulin and complement in inflammatory renal disorders are under way. Work with immunosuppressive therapy in nephrosis has begun. Dr. E. R. Yendt (TGH) with Dr. M. Cohanim is investigating renin and angiotensin, studying diurnal variation of renin, variation of renin in the menstrual cycle, the effects of hemodialysis on circulating renin levels and so forth. Dr. Yendt is also studying disorders of calcium, phosphorus and magnesium metabolism and investigating renal tubular disorders. Work on renovascular hypertension continues. The effect of thiazides on calcium output is being studied in patients with idopathic hypercalciuria and osteoporosis. Thiazide therapy is being used in an attempt to prevent the formation of renal calculi. Urinary hydroxyproline is being measured. Dr. Raymond Gagné is reviewing the experience of the hospital in primary hyperparathyroidism.

Respiratory Diseases

Dr. C. R. Woolf is studying a variety of problems in the cardiorespiratory laboratory at the Toronto General Hospital. This includes studies of muscle ozygen tension in the respiratory muscle, the effect of training in patients with advanced chronic obstructive lung disease, carotid body removal in asthma. A long-term retrospective and prospective study of the effect of cigarette smoking in women has been undertaken. The effect of various drugs on pulmonary function is being investigated. Investigation of the surgical treatment of emphysema has been carried out.

Rheumatology

Dr. J. S. Crawford (TWH) is planning the opening of a Rheumatic Disease Unit at the Toronto Western Hospital. Dr. John Digby at St. Michael's Hospital has been studying general clinical problems. Dr. T. A. Gordon (TGH) is using immunodiffusion techniques to characterize and quantitate immunoglobulins in various rheumatic disorders. He has also prepared a documentation outline to be used for long-term clinical evaluation and follow-up of patients in the unit. He has collaborated with Drs. Franklin and Mustard on cellular damage and platelet aggregation associated with tissue cultures inoculated with rheumatoid arthritis synovial fluid. A study with Dr. Lars Karstead of the Ontario Veterinary College is underway. Dr. J. Houpt (NMSH) is investigating abnormalities of tryptophan metabolism in rheumatic diseases and the use of allopurinol in gout. Dr. M. A. Ogryzlo, who is acting as co-ordinator of the activities of this group, reports on the use of allopurinol in the treatment of uric acid stone, myeloproliferative disorders, and acute uric acid nephropathy. This work has included Drs. Houpt, Webber and Urowitz. The role of blood platelets in atherosclerosis and gout and the effect of various drugs on platelet activity are being studied by Drs. Smythe, Mustard and Blakely. Dr. Smythe is also trying to determine whether there is any amino acid which has a common transport mechanism with uric acid across the renal tubule. Drs. Smythe and Cogswell have concluded the study of pulmonary fibrosis in rheumatoid arthritis in collaboration with Dr. Woolf.

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OBSTETRICS AND GYNAECOLOGY

Under the direction of Professor W. M. Paul

No essential changes in undergraduate education have taken place in the past year. The clinical clerkship of students at the Wellesley Hospital continues to receive enthusiastic acceptance by students and staff alike in that unit. A Curriculum Committee of the Department has begun work on curriculum planning for Obstetrics and Gynaecology as it will relate to a new programme in basic medical science and a new organization within the medical school.

Demand for graduate training in Obstetrics and Gynaecology continues to be

high and the quality of applicants to be gratifying.

Drs. J. H. Booth, D. J. Gare, E. E. Johnston, J. E. Morgan and J. H. Whiteside became Fellows of the Royal College of Surgeons of Canada during this year. Dr. Booth will continue his studies at Middlesex Hospital in London prior to returning to the Department of Obstetrics and Gynaecology at the University of British Columbia. Dr. Morgan is at present continuing his studies at the University of Liverpool prior to returning to this Department. Dr. Johnston will continue his studies in the Department of Pharmacology at the University of Alberta.

Dr. G. Urbach is obtaining further experience in immunology in London prior to his return to the Wellesley Hospital in this Department. Dr. John Milligan has completed his first year of study at the Nuffield Foundation for Medical Research at Oxford. He will continue in this department for another year prior to returning to

this University.

Dr. F. R. Papsin returned from one year's travel abroad to take up a post at the Toronto Western Hospital. He will continue his interest in gynaecologic cancer.

Refresher courses for general practitioners were conducted by the Department during November and January and the second refresher course for specialists was held in March.

The Department was honoured by visits from Professor T. N. A. Jeffcoate, University of Liverpool, and Professor George B. Maughan of McGill University, Montreal.

In September, the Department was host to the Phi Delta Epsilon Gynaecologic Travel Club and in May 1966 were delighted by the visit of the British Gynaecological Travellers, with whom a three-day joint scientific session was held.

Dr. W. H. Allemang has been appointed to a geographic full-time post at the Toronto General Hospital with the rank of Professor of Obstetrics and Gynaecology.

This year saw the retirement of Dr. Geraldine Maloney as Obstetrician and Gynaecologist-in-Chief at the Women's College Hospital. Formerly on the staff of the Toronto General Hospital, Dr. Maloney undertook the direction of this department in 1958. Under her leadership, the department established an enviable record in undergraduate and graduate training in Obstetrics and Gynaecology. Dr. Maloney will continue in consulting practice. The Department, and in particular, her graduate students, acknowledge with gratitude the contribution she has made and wish her the best of good fortune. She will be succeeded by Dr. Walter J. Hannah who will assume his duties on July 1 with the rank of Assistant Professor.

The past year has seen a great amount of activity concerning plans for changes in the medical school and adjustments required in clinical teaching in the face of widespread health insurance. The staff of all units have considered the formation of teaching units and have been active in planning facilities necessary for the provision of exemplary service in a clinical teaching situation. The impact of these two major

changes is yet to be felt and considerable organization needs to be done.

The Head of the Department in his first year in this post wishes to thank his colleagues in the Department and the Faculty at large for their assistance during the past year. The support of Dean Hamilton during this time is also appreciated.

SCHOLARLY ADDRESSES

Ontario Cancer Foundation Seminar on Carcinoma of the Ovary, Windsor, November 1965: Dr. C. P. Vernon, "The Chemotherapy of Ovarian Carcinoma."

Canadian Society for Clinical Investigation, Montreal, January 1966: Dr. C. C. Gold (Dr. R. Wilson), "The Excretion of Phenolic Steroids and its Clinical Signifi-

cance in Rh Iso-immunized Pregnancies."

Royal College of Physicians and Surgeons of Canada, Montreal, January 1966: Dr. W. M. Paul, "Placental and Cord Blood Circulation"; Dr. C. P. Vernon, "Progestational Agents in the Treatment of Metastatic Endometrial Carcinoma"; Dr. R. Wilson, "The Role of Rapid Assays of Maternal Urinary Estrogens in the Assessment of the Fetal-Placental Unit," Dr. R. Wilson, "The Endocrinology of the Fetal-Placental Unit."

American College of Physicians, Toronto, March 1966: Dr. R. Wilson, "The Control of Ovulation."

RESEARCH

Members of the staff have undertaken the following research activity.

Dr. T. A. Doran has begun an investigation of asymptomatic post- and perimenopausal females at the Toronto General Hospital. Patients are being screened by routine cervico-vaginal cytology and by endometrial lavage for asymptomatic malignancies of the genital tract, with particular reference to endometrial carcinoma. He is continuing his clinical assessment of amniocentesis and intrauterine transfusion in the management of erythroblastosis foetalis. Studies of enzymes in amniotic fluid are being carried out in conjunction with the Department of Laboratories. Financial support from Dominion Stores Limited, which is gratefully acknowledged, has assisted these investigations.

Dr. J. L. Harkins, in conjunction with the Department of Paediatrics, has conducted studies of young children born to mothers who have undergone mitral commissurotomy during pregnancy. Studies on dihexyverine in labour are drawing to a

close and it is anticipated that statistical analyses will soon be available.

Dr. J. W. Millson and Mr. R. Roy of the Toronto Western Hospital have continued their studies on amniocentesis in Rh sensitized patients and intra-uterine foetal transfusions.

Dr. L. Organ, who also holds an appointment in the Department of Physiology, has begun an investigation of foetal electrocardiography. This work is being conducted on selected patients at the Toronto General Hospital.

Dr. C. S. Russell is evaluating Teflon intra-uterine devices for contraception. With Dr. D. C. H. Ley of the Department of Haematology at the Toronto Western Hospital, Dr. Russell continues his study of pregnancy anaemia.

Dr. T. G. Ryley continues his study of the chromosome constitution in early

abortions at the Wellesley Hospital.

Dr. C. P. Vernon has continued studies on the assessment of chemotherapeutic agents in the treatment of metastatic ovarian carcinoma. A combination of antimetabolites and alkylating agents has been used. Considerable interest has arisen in intraarterial infusion techniques for regional metastatic carcinoma, particularly that of the vulva. These projects are supported by the Ontario Cancer Research and Treatment Foundation. Studies on the use of progestational steroids in endometrial carcinoma have continued and the results of the first three years of study will soon be published. This work has been carried on at the Toronto General Hospital and the Princess Margaret Hospital.

The method developed by Drs. S. L. Cohen and R. Wilson for the rapid determination of estrogen levels excreted during late pregnancy has been applied to over 300 patients, including a considerable number of complicated pregnancies. This particular method is gaining considerable acceptance in other units. A paper will be

published later this year.

Dr. Cohen has continued with his study of the patterns of estrogen excretion during complicated pregnancies and has demonstrated that in many instances the levels of the non-classical estrogens are much higher than would be anticipated. He is developing this method further so that it may be applicable to non-pregnant states. He continues to study the inhibitors and activators of hydrolytic procedures in pregnancy urines.

Dr. Wilson is continuing his work on the activity of the foetal adrenal gland. A number of mid-trimester foetuses were perfused in Sweden during the summer of 1965 and in 1966. The study of the foetal gonad has also been undertaken. A new perfusion apparatus has been built and the investigation of conjugating mechanisms in isolated organ perfusions is being carried out. The oxygenator developed last year has been improved and a new model constructed.

Publications

DORAN, T. A. and THOMPSON, D. W. "Malignant Cells in the Peripheral Blood of Patients with Endometrial Carcinoma" (American Journal of Obstetrics and Gynecology, vol. 94, no. 7, Apr. 1, 1966, pp. 985-90).
HENDERSON, D. N., HARKINS, J. L. and STITT, J. F. "Pelvic Tuberculosis" (American

Journal of Obstetrics and Gynecology, vol. 94, no. 5, March 1, 1966, pp. 630-6).

NORRIS, J. R., RYLEY, T. G. and URBACH, G. I. "The Testicular Feminization Syndrome" (Canadian Medical Association Journal, vol. 93, no. 14, Oct. 2, 1965, pp. 765-7).

WILSON, R., SHEPLEY, D. J. and LLEWELLYN-THOMAS, E. "A Membrane Oxygenator with Low Priming Volume for Extracorporeal Circulation" (Canadian Journal of Surgery, vol. 8, July, 1965, pp. 309–11).

OPHTHALMOLOGY

Under the direction of Professor Clement McCulloch

During the year the content of the material taught to the undergraduate students has been changed. It had previously been assumed that the undergraduate medical student was being taught sufficient ophthalmology for general practice. This assumption has been dropped in favour of the idea that he is being trained as a basic physician who is knowledgeable in the general concepts of medicine. On that basis the lectures and clinics have been oriented towards a basic understanding of the field of ophthalmology and an appreciation of the major ophthalmic diseases.

The graduate programme for the training of ophthalmologists continues to grow. There are now 17 students enrolled. The first year men have, in order of importance, three responsibilities: (a) to learn the basic science of the specialty; (b) to undertake a research project and to bring it to completion and present and defend it; and (c) to do limited service functions preliminary to their subsequent training in the specialty. In the first year the students are supported from sources outside the teaching hospitals and we are grateful for this assistance. Dr. Barbara Craig and Dr. Warren Allin, both of Toronto, are Canadian National Institute for the Blind Fellows, Dr. Frederick Feldman of Toronto is supported by the Defence Research Board of Canada, Dr. Glasier Somerville of New Brunswick is a Fellow under a Provincial Health Grant and Dr. F. G. Marriott of St. Catharines is a special Fellow working in the Department jointly supported by a Public Health Grant and the Hospital for Sick Children. Dr. V. K. Raman and Dr. O. P. Kulshrestha are Colombo Plan Fellows from India working in the Department.

The second year of the training programme for ophthalmologists is devoted to clinical experience in the hospitals. The Department gives a programme of lectures and demonstrations designed to provide understanding and experience in the examination and diagnosis of disease. The five University teaching hospitals are used, with the men passing through them in rotation. The doctors completing this rotation are Drs. D. H. Dickson, J. E. Graham, J. R. Elder, J. R. Miller, J. Cardarelli, E. V.

Rafuse, B. Newbigin and J. K. Warnica.

The final year of training is devoted to further hospital work, particularly in the management of disease, surgical training and experience. The men taking this year and completing their training are Drs. R. L. Alexander, I. O. Drysdale, P. E. A. Hiscox, J. A. Parker and C. J. Radford.

The Department is now offering six men each year a progressive training programme covering three years of study and fulfilling the requirements to appear for

the Fellowship examination in ophthalomology.

Dr. John F. Morgan successfully passed the Fellowship examination of the Royal College of Physicians and Surgeons of Canada modified for ophthalmology and Drs. B. Liddy, H. McCartney, N. A. Wine, H. L. R. Wiebe, J. J. Kazdan and W. G. Rombough received Certificates in ophthalmology from the Royal College. Dr. B. Slatt and Dr. B. Zucker have passed their Fellowship examinations and have joined

the Department as Clinical Teachers.

Dr. J. D. Morin returned during the year from study on a McLaughlin Fellowship to join the staff of St. Michael's Hospital and has opened a glaucoma clinic at that Hospital. Dr. L. D. J. Chisholm has continued his studies on retinal detachment on a Fellowship from the Retina Foundation in Boston, has returned to the Department, joined the staff of the Toronto Western Hospital and is opening a retinal detachment clinic at that Hospital. Dr. J. J. Kazdan has been studying at the Proctor Foundation Laboratory in San Francisco where he has worked particularly with uveitis and ocular external diseases. His studies have been supported by a Fellowship from the American Academy of Ophthalmology and Otolaryngology. Dr. John A. Parker has received a McLaughlin Fellowship to study optical design at the Institute of Optics of the University of Rochester.

The annual Eye Surgery clinical meeting was held February 16–18, under the direction of Dr. Harry Macrae. The two guest speakers were Dr. Richard C. Troutman, Professor of Ophthalmology at New York University, and Dr. Angus McLean, Associate Professor of Ophthalmology Emeritus, Johns Hopkins Hospital, Baltimore. Dr. Troutman gave a detailed account of techniques and instrumentation of ocular microsurgery. Dr. McLean discussed details of the care and management of glaucomatous patients. The rest of the meeting was devoted to a discussion of surgical techniques, with demonstrations. Movies were used throughout. The use of teaching aids allowed the rapid development and great depth of discussion of detailed surgical

problems.

The sixth annual meeting of the University Eye Alumni was held in conjunction

with and following the Eye Surgery clinical meeting on February 18. The five senior residents gave papers competing for the Alumni Prize. It was won by Dr. P. E. A. Hiscox for a paper entitled "Clinical Experience with Phospholine Iodide Toxicity." Dr. Lorenz E. Zimmerman, of the Armed Forces Institute of Pathology, Washington, was the Walter W. Wright Lecturer. He gave an extensive talk on the pathologic changes related to malignant melanoma of the uvea. Dr. J. Stobo Pritchard was guest speaker at the banquet held during the meeting.

The Department wishes to thank the Alumni for their interest in University activities. Each year they generously give support through the A. J. Elliot Travel Fund and also take an interest in departmental activities and in the public health aspect of ophthalmology in Ontario. The Department circulates a weekly newsletter to all ophthalmologists in Ontario. There has been an excellent response to this publication and there is a continuous visiting of the Department through ward

rounds and other departmental meetings.

An ophthalmology course for general practitioners was given March 17–18 under the direction of Dr. G. A. Thompson. This was the first time such a course was attempted by the Department; 28 attended. Subjects were chosen after an extensive questionnaire was circulated among a number of practitioners. It was felt that the success of the course indicated that it was filling a need and that it should be put

on at regular intervals.

The annual Research Meeting of the Department was held April 30. The guest of honour was Dr. Maurice E. Langham of Johns Hopkins University. He spoke on the significance of intraocular pressure decay curve and the evaluation of tonography and pressure cup techniques in the diagnosis of glaucoma. The five Fellows of the Department presented their research studies of the year. Dr. W. D. Allin was awarded the John Gaby prize for his paper on the "Effect of Cations on Adenosine Triphosphatases of Corneal Epithelium." Sixteen papers were given by members of the Department covering many of the problems of ophthalmology. A number of guests from other centres attended. Dr. V. Kalevar of India presented a paper on the preservation of donor corneas; Dr. G. E. Johnson of the Department of Pharmacology and Mr. H. O'Beirne from the Department of Bio-medical Electronics presented papers. The departmental Research Meeting is now a recognized meeting drawing a number of workers from other departments and from neighbouring centres. Concerning the research side of the Department, we would particularly like to thank Mr. H. G. Stapells who has taken an interest and has supported this basic work. Through his efforts a number of contributions have been possible and the research programme has become established and recognized.

The Department continues to develop a programme of regular ophthalmic clinics and special ophthalmic clinics at the teaching hospitals. At the Hospital for Sick Children the orthoptic work is being enlarged, with particular study being given to amblyopic children. This work is under the direction of Dr. J. S. Crawford. Dr. W. P. Callahan is taking a particular interest in the subject of amblyopia assisted by Miss T. Crisall. A new glaucoma clinic has been started at St. Michael's Hospital and a retinal detachment clinic at the Toronto Western Hospital. The Eye Pathology Laboratory has continued to grow under the direction of Dr. W. S. Hunter, assisted by Miss E. Forster. Its services are being widely used across the Province and material from this Laboratory has been a source for a number of studies done by staff of the Department. Assistance is obtained from the Department of Pathology through Dr. J. B. Walter. The work of the Eye Bank, under the direction of Dr. G. A. Thompson and Dr. P. K. Basu, has been steadily increasing. We are now able to give twenty-four hour coverage in the Toronto area for the taking and transporting of eyes.

The staff have attended many outside centres and their attendance at only a few conferences can be mentioned. Dr. M. Shusterman attended courses at Baylor University, Wills Eye Hospital, Northwestern University and St. Luke's Hospital in New York studying retinal detachment. Dr. Bernard Zucker attended the Third Boston Conference on the Cornea in May. Drs. C. B. Mortimer and M. Shea gave papers

at the annual meeting of the Royal College of Surgeons of Canada. Dr. H. P. Brent attended the Mid-Western Seminary on Ophthalmology in Miami. In addition to these meetings, it should be mentioned that a number of our staff attended the annual meeting of the Canadian Ophthalmological Society and presented papers. They-also largely supported the Toronto Academy of Medicine, Section of Ophthalmology, and

the Section of Ophthalmology of the Ontario Medical Association.

Members of the Department have held a number of positions of national and international importance in the field of ophthalmology. Dr. R. G. C. Kelly has continued as Secretary of the Canadian Ophthalmological Society. Dr. H. R. Hausler has been Chairman of the the Section of Ophthalmology, Toronto Academy of Medicine. Dr. J. S. Speakman has continued his work on the advisory committee on ophthalmic research of the Department of National Health and Welfare. Dr. G. A. Thompson is head of the Eye Bank of Canada (Ontario Division) and is Chairman of the Eye Bank Committee of the Canadian Ophthalmological Society. Dr. Clement McCulloch continues as an associate editor of both the *Transactions* of the American Ophthalmological Society and of the *Transactions* of the Canadian Ophthalmological Society. In this regard he has participated in the formation of the new *Canadian Journal of Ophthalmology* which will now take in the *Transactions* of the Canadian Society as well as accepting papers and editorial comment.

Of particular interest was the formation of the Canadian Ophthalmic Pathology Study Club. The first meeting was held at the time of the Toronto Eye Surgery clinical meeting. Ophthalmic pathologists from across Canada attended. The guest of honour was Dr. Lorenz E. Zimmerman. Dr. W. S. Hunter was appointed Secretary. The group plans to exchange material and to have annual meetings, usually

in conjunction with one of the main Canadian ophthalmic meetings.

A number of distinguished ophthalmologists visited the Department during the year. Dr. John V. V. Nicholls gave the first Morgan Lecture at the Hospital for Sick Children on "The Principles and Management of Strabismus" and also participated in a symposium on reading difficulties. The following day he participated in departmental ward rounds held at the Toronto General Hospital. Professor Paul Weinstein of Budapest, Professor Robert Kennedy of Rochester, New York, Professor Henry Allen of Harvard University, Professor D. K. Pischel of the University of California and Professor James McGraw of Syracuse all visited the Department and took part in the teaching programme. In addition we had a number of visitors from Queen's University and the University of Western Ontario who took part in our programme; many from the United States and England gave lectures or took part in our teaching programme. Mr. J. Winstanley of London, England, gave a lecture on "Postcongestive Triad" to the postgraduate students.

The Department would like to express its gratitude to the Canadian National Institute for the Blind and the E. A. Baker Foundation for the support of two graduates, Dr. Y. Matuk and Dr. B. Zucker and also for help in other financial difficulties such as the publication of coloured plates. The Department has received anonymous support for the Selkirk Fund which has been most helpful in allowing

our research staff to visit other centres.

The Department would like to welcome Dr. B. Zucker, Dr. B. Slatt and Dr. J. D. Morin. Dr. Zucker has studied corneal problems under Dr. C. H. Dohlman at Harvard University, Dr. Slatt returns from studies on neuro-ophthalmology in California and Dr. Morin from a research year with Dr. Robert Shaffer in San Francisco. Also, it should be mentioned that the outpatient eye staff of the teaching hospitals is now assisting with the main departmental teaching programme. These men are Drs. M. Kazdan, H. P. Brent, M. Arstikaits, W. D. Samis, P. L. Morton, H. R. Sniderman, S. J. Vaile, T. J. Pashby, J. W. Hiltz, D. Black and D. W. Harper. The Department notes with regret the resignation of Dr. Bernard Teichman from the indoor staff of the Toronto Western Hospital to become Chief of Ophthalmology at the New Mount Sinai Hospital.

The Department would like to emphasize its appreciation of the work of all the

academic staff. In the matter of undergraduate teaching the staff have carried on their work with enthusiasm and imagination. The graduate programme has now advanced from five to six men a year for the three-year course. All five teaching hospitals give the fullest co-operation and the programme is continuing to grow in

strength.

The research side of the Department is continuing to develop and separate research programmes are starting in three of the teaching hospitals. These are all being tailored into the main departmental programme and the co-operation that makes this possible all across the City is greatly appreciated. We would like to thank the secretarial staff who have supported all the work of the Department so faithfully. There are many things that pass unnoticed but which still involve much work, for example the weekly newsletter which is sent to all the ophthalmologists in Ontario and which is a key route of communication with practising oculists. Such duties have played a key part in the development of the Department.

SCHOLARLY ADDRESSES

Dr. J. S. Speakman attended the International Congress of Anatomy at Weisbaden, Germany, in August and spoke on "The Development of Drainage Channels in the Trabecular Meshwork." Dr. Speakman also gave a special series of lectures at the University of Ottawa in Janauary 1966.

Dr. P. K. Basu presented a paper on "Some Aspects of the Corneal Graft Reaction and its Control" at the Symposium on Suppression of Graft Rejection with

Emphasis on the Cornea at Little Rock, Arkansas, in November 1965.

Dr. Y. Matuk represented the Department at the meeting of the East Central Section of the Association for Research in Ophthalmology in Cleveland, Ohio, in January 1966. Dr. Matuk will present a paper at the Canadian Ophthalmological Society meeting in June of this year on the "Effect of Cations on Adenosine Triphosphatases of Corneal Endothelium."

Dr. T. M. Sibay also attended the meeting in January of the East Central Section of the Association for Research in Ophthalmology in Cleveland. He presented a paper on "Observations of Spontaneous Diabetes in Genetically Related Dogs."

Dr. J. S. Crawford was the guest of honour at the Pittsburgh Ophthalmological Society meeting in April of this year. As chairman of the Visual Panel, Dr. Crawford attended the 10th annual meeting of the Defence Research Board in Ottawa, in

January 1966.

Dr. Joseph C. Hill spoke on "Enophthalmos and its Correction" at the second International Symposium on Ocular Plastic Surgery at the Manhattan Eye, Ear and Throat Hospital in New York, and gave lectures on ophthalmic plastic surgery at the American Academy of Ophthalmology and Otolaryngology.

Dr. H. M. MACRAE spoke on retinal detachment at the meeting of the Pan

American Association of Ophthalmology in Rio de Janeiro, in August 1965.

Dr. Bernard Teichman participated in the annual Eye Teaching Day of the State University of New York at Buffalo, in May of this year. He spoke on dacryo-

cystorhinostomy.

Dr. CLEMENT McCulloch presented a paper on flash blindness at an AGARD Meeting in Paris, in March, was guest of honour at the meeting of the New York Glaucoma Association, in May, and participated in the annual meeting of the American Ophthalmological Society.

Dr. Michael Shea presented two papers in Chicago, in November, on cryotherapy and cryolysis. In June of this year he was a guest at the Philadelphia Wells

Eye Hospital, speaking on "Freon cryotherapy in retinal detachment."

RESEARCH

Under the National Health Grant "Corneal Opacities and their Treatment" and an outright Medical Research Council Grant, Dr. P. K. Basu is continuing studies

on the immunological and biochemical problems of corneal opacifications and their treatment by various means, including corneal grafting, and on ocular tissue preservation. In these studies he has been assisted by Drs. Y. Matuk and B. Zucker and Mrs. A. Wolf. A comprehensive study on ocular cytology is continuing with the assistance of Dr. P. Sarkar of the Department of Botany. With Mrs. N. Sarkar, analysis of the chromosomes of patients suffering from hereditary eye diseases is being carried on. With Mrs. I. Fielding and Mr. F. Carre, the behaviour of corneal and other ocular cells is being studied using fluorescent microscopic techniques, time lapse cinematography and electron microscopical methods. A project on the effect of dimethyl sulfoxide on the corneal cells is continuing and, with Dr. V. K. Raman, a Colombo Plan Fellow, a project on the control of corneal edema has been completed.

Dr. Y. Matuk and Mrs. E. Marai are continuing their studies on the protein metabolism of the clear and opaque cornea. With the assistance of Dr. W. D. Allin they are also working on the NAK dependent ATPase of the cornea. Dr. B. Zucker, with the assistance of Mr. N. Matuk, is investigating the effect of injury of the cornea on the cytology of the tear fluid. With Dr. C. H. Tator and Dr. T. P. Morley, of the Departments of Neuropathology and Neurosurgery, a project on the immunity

of the anterior chamber of the eye to brain tumours has been completed.

Mrs. A. Wolf is continuing her work as Executive Secretary of the Eye Bank of Canada (Ontario Division). Since April 1966, the Eye Bank Laboratory has been financially supported by the Ontario Hospital Services Commission. From the beginning of the Eye Bank programme in 1955, 2,210 eyes have been donated and 1,060 of these have been used for corneal transplantation. The total number of people who have pledged their eyes by signing donor cards is now 30,000. The Eye Bank is a joint project with the Canadian National Institute for the Blind.

The Corneal Research Clinic, supported by the corneal National Health Grant, continues to operate twice monthly at the Toronto General Hospital under the direction of Dr. G. A. Thompson, who is also the Director of the Eye Bank of Canada (Ontario Division). Dr. Thompson is investigating a family showing a rare corneal dystrophy and, with the help of Dr. V. K. Raman, is also studying the

incidence of corneal guttate in cataract patients.

With the support of a National Health Grant entitled "Prevention of Blindness from Glaucoma," Dr. J. S. Speakman is continuing morphologic studies on the pathogenesis of open-angle glaucoma. He is also conducting studies on the most suitable management of chronic simple glaucoma complicated by cataract formation before and after filtration surgery. Under the same Grant, Dr. R. K. MacDonald, assisted by Miss D. Kisielius, is continuing work on seton operations in glaucoma. With Dr. B. J. Craig he is studying vascular factors as a cause of reduced scleral rigidity in filtering eyes. Dr. J. D. Morin, who has recently joined the Department, has started a glaucoma clinic at St. Michael's Hospital. The Glaucoma Clinic at the Toronto General Hospital under the direction of Dr. J. S. Speakman is increasingly busy. Extensive studies on patients are undertaken, including special tonography, tonometry and field testing. Miss T. Fredette and Mrs. D. Ashead are assisting in this work.

Under a National Health Grant entitled "Clinical Investigation of Ideopathic Retinal Detachment," Drs. M. Shea, D. H. Dickson and G. M. Somerville are conducting experiments on the application of cryotherapy in retinal detachment. In this connection they have completed a project on the effect of freezing of the corneal endothelium. Dr. C. B. Mortimer is continuing his work in photocoagulation and cryosurgery. With Dr. Somerville he has completed a project on experimental en-

circling procedures with silicone bands.

With the aid of a National Health Grant entitled "Studies on the Pathology, Prevention and Treatment of Diabetic Retinopathy," Dr. H. R. Hausler, with the assistance of Dr. T. M. Sibay, Dr. B. J. Craig and Miss B. Stachowska, is continuing analysis of ocular complications of diabetes. A diabetes clinic has been conducted at the Toronto Western Hospital where a double blind study concerning the effect of

lipotropic agents and bioflavinoids in the treatment of diabetic retinopathy is being conducted. Dr. Hausler and his associates are investigating the pathogenesis of diabetic retinopathy in man and in animals. With the help of Miss Stachowska and Dr. L. Butler of the Department of Zoology, a Chinese hamster colony is being maintained. Retinal vascular lesions have been encountered in these animals and Dr. Hausler's group are investigating the metabolic changes which lead to breakdown of the normal vasculature. A study has been completed on the effect of insulin on the retinopathy of weanling diabetic hamsters. An analysis of the retinopathy in a diabetic dog also has been completed. Also under this grant, with the assistance of Dr. T. M. Sibay and Dr. J. R. Elder, an investigation is in progress on the incidence of changes in the eyes of mentally retarded diabetic patients.

Under a grant from the Defence Research Board, Drs. C. McCulloch, F. Feldman and Mr. P. J. Foley are conducting research on the recovery of foveal visual

acuity after parafoveal high intensity flashes.

With the help of a grant from the Atkinson Foundation, Dr. D'Arcy Macdonald has continued his work on a special contact lens clinic at the Toronto Western

Hospital.

The clinical staff of the Department has undertaken a number of studies in fields related to their clinical interests. Dr. J. C. Hill, with the assistance of Dr. O. P. Kulshrestha, a Colombo Plan Fellow from India, has made a survey of the results of lacrimal sac surgery. They have also studied the etiology and treatment of senile epiphora in patent lacrimal passages. Dr. M. Shusterman is continuing his clinical research on vitreous floaters, retinal detachments and surgical problems in children. He has produced a movie on a technique of cataract surgery in children. Dr. J. S. Crawford and Dr. F. G. Marriott have completed a project on corneal grafting following alkaline burns and have been developing improved goniotomy procedures. Dr. L. A. Lloyd is continuing her research on neuro-ophthalmology problems. Dr. W. S. Hunter continues his work on ophthalmic pathology and remains a source of

reference for the pathology studies in the Department.

Dr. Maria J. Arstikaitis and Dr. E. Rafuse have made a clinical study of twenty thalidomide children. Dr. Arstikaitis has been following the eyes of premature babies with respiratory distress syndrome. Drs. Speakman and Mortimer, in collaboration with a number of the staff of the Toronto General Hospital, are making an assessment of pituitary ablation for diabetic retinopathy. They have also been investigating the ocular findings in haemoglobin S-C disease. Dr. Thompson is continuing his work on the use of radioactive phosphorus as an aid in the diagnosis of intraocular lesions suspicious of malignancy. With Dr. I. O. Drysdale, he has completed a review of sequelae from overtreatment at the limbus by strontium applications. Drs. W. D. Samis and H. P. Brent are studying fluorescein photography of the ocular fundus. Dr. Samis is conducting a project on the detection of P32 in melanomas of the eye. Dr. B. Teichman is working on the problem of amblyopia. Dr. D'Arcy Macdonald, in addition to his contact lens project, is studying results from the use of low vision aids. Dr. John A. Parker has developed a method of stationary streak retinoscopy.

PUBLICATIONS

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no. 3, Sept., 1965, pp. 475-81).

DAYAL, Y. and CRAWFORD, J. S. "Evaluation of the Results of Surgery to Correct Congenital Ptosis of the Upper Eyelid" (Canadian Medical Association Journal, vol. 94, no. 22, May 28, 1966, pp. 1172-8).

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74, no. 4, Aug., 1965, pp. 335-60).

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HUNTER, W. S. "Eye Abnormalities Associated with Retinal Dysplasia" (Canadian Journal

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OTOLARYNGOLOGY

Under the direction of Professor P. E. Ireland

After preparing a great number of annual reports to the President, it is with some regret that I compose my last presentation. Changes come and the retirement of a department head usually brings fresh ideas and progress with a younger and more vigorous replacement. It does end an era which may be good or bad for a department, the Faculty of Medicine and the University. The retiring Professor wishes first in this report to thank the President and the administrative authorities, the three Deans (two of them deceased) under whom he has served and his associates

for their sympathy and co-operation. He also wishes to express confidence for the future of this Department under the leadership of Professor Douglas P. Bryce.

Unfortunately most annual reports involving a period of twelve months do contain a fair amount of repetition. This I am going to avoid this year, except to say that our undergraduate teaching is well organized and functions well. The post-graduate division progresses smoothly and now has a registration of 17 excellent students for the four-year programme. In the field of continuing education in Oto-laryngology we presented a course limited to specialists with Professor Shambaugh of Northwestern University and Professor Work of the University of Michigan as guest teachers. The other course in Otolaryngology for general practitioners was presented at St. Michael's Hospital. Both of these were oversubscribed.

Members of our staff have continued to be in demand for clinical and scientific papers on this continent and abroad. Honours have been given to the Head of the Department, who presented a special lecture at the Royal Society of Medicine in England and to Dr. Blair Fearon, who was elected as the first Canadian President of the American Broncho-Oesophagological Association. Professors Ireland and Dohlman presented papers and Dr. Wilfred Goodman a movie at the International Congress of Otolaryngology in Tokyo. Professor Ireland continued around the world and spent three weeks in India where twenty lectures were given at various centres. Professor Dohlman travelled from Tokyo to Australia where a series of lectures were given at three centres. After three and one-half years in research in our Department, the National Institutes of Health discontinued their generous grant to support Professor Dohlman's research. Canadian research funds have been found and he will return to Toronto after a summer holiday in his native Sweden.

At the present time there are extensive plans for change and progress in this medical school. Many of these are long overdue if we are to compete in modern medical progress. The Head of the Department only regrets that many of his plans never reached the point of completion. He is, however, very confident in the new leadership in the Department and the capabilities and loyalty of the other staff members.

There have been a few staff changes during the past year. Dr. D. B. French retires as Assistant Professor and Otolaryngologist-in-Chief at the Toronto Western Hospital to which post he was appointed after World War II. He has been replaced by Dr. R. D. Bell. Dr. D. A. Haldenby, who was a McLaughlin Fellow in England, has joined the staff of the Toronto Western and the University Department. Dr. Hawthorne Steele has retired from St. Michael's Hospital after long and faithful service. To the two members who have retired I wish to extend thanks for their support.

Brigadier C. A. Rae, M.D., F.R.C.S.(Ed.), F.R.C.S.(C), died late in May. He had a brilliant military and academic career. He was an Assistant Professor when he left to command the 15th Canadian General Hospital and take this group from our medical school to England in December 1939. He was later in charge of all medical personnel from Headquarters in London. He returned to be Chief of the Department in Christie and Sunnybrook Hospitals and Adviser to the Director-General, Treatment Services, of the D.V.A. Dr. Rae remained as a Graduate Lecturer in our Department until his death and will be sincerely missed from our activities.

SCHOLARLY ADDRESSES

Dr. T. D. R. Briant was a guest speaker and presented a paper on "Transphenoidal Hypophysectomy" at the American Rhinological Society in Chicago, in November 1965.

Dr. T. D. R. BRIANT presented a paper on "Rhinological Procedures for the Treatment of C.S.F. Rhinorrhoea" at the Academy of Medicine, Section of Otolaryngology, in April 1966.

Dr. Douglas P. Bryce presented a paper entitled "Prolapse of the Laryngeal Ventricle" at the annual meeting of the American Laryngological Society in Puerto Rico, in April 1966.

Dr. Gosta F. Dohlman presented two papers: on the "Experimental Production of Ménière's Disease" at the VIIIth International Congress of Oto-Rhino-Laryngology in Tokyo, Japan, in October 1965; on "Experiments on the Mechanism of Ménière-like Attacks" at the Canadian Otolaryngological Society in Montreal in June 1965.

Dr. Blair Fearon presented two papers: on "Paediatric Adenoidectomy and Tonsillectomy: Divergent Views" at the Canadian Otolaryngological Society in Montreal in June 1965; on "Airway Problems in Children following Prolonged Endotracheal Intubation" at the 46th annual meeting of the American Broncho-

Oesophagological Association in San Juan, Puerto Rico, in April 1966.

Dr. P. E. Ireland presented three papers: on the "Newer Concepts in Testing of Hearing by Electroencephalography" at the VIIIth International Congress of Oto-Rhino-Laryngology in Tokyo, Japan, in October 1965; on "E.E.G. in the Diagnosis of Deafness in Children and Infants" at the All India Institute of Medical Sciences in New Delhi, India, in November 1965; on "The Young Deaf Child: Identification and Management" at the Chandigarh Institute of Medicine in Chandigarh, Punjab, India, in November 1965.

Dr. Robert E. Macdonald presented a paper on "Airway Problems in Children following Prolonged Endotracheal Intubation" at the Academy of Medicine, Section

of Otolaryngology, in April 1966.

RESEARCH

Research activity has continued to expand with the continuance of several projects already under way together with the addition of several new ones. Although the administration and much of the laboratory work has been carried out in the Banting Institute, considerable research activity has been allocated to associated

laboratories because of the availability of certain specific facilities.

In the Toronto General Hospital (Vertigo Unit) and through the generosity of the John A. Hartford Foundation of New York City research activity has been most active. This has been concerned mainly with the diagnosis and treatment of diseases of the organ of balance under the direction of Drs. Barber, Johnson and Farkashidy. Studies on the Coriolis Phenomenon have been carried out employing both visual and photographic recording of eyeball movements using normal and clinically abnormal human subjects. It was learned that head tilts in the coronal plane, during simultaneous axial rotation of the trunk, normally produced chiefly vertical nystagmus. The next step in the investigation was to devise some means of applying accurately controlled and graded accelerations of this type, so that the threshold nystagmus responses could be determined. To do this, a tilt device was mounted over the axis of the rotating table and the subject's nystagmus recorded by electronystagmography.

With the assistance of the University Department of Pharmacology, a study was initiated to determine the relative effectiveness of different drugs as anti-nauseant and anti-vertigo agents. Vertigo with accompanying nystagmus was induced by caloric stimulation of the lateral semicircular canals and the resulting nystagmus recorded by electonystagmography. Nausea was induced by exposing the subjects to appropriate multi-planar angular accelerations (nodding head movements superimposed upon trunk rotating around the vertical axis). A graphic recording technique to indicate pallor and "cold" perspiration is being developed with the help of the Department of Bio-medical Electronics. Prototype devices were tested with promising results, the successful development of which should provide valuable and unique aids for such

drug testing.

Eye movements, whether resulting from semicircular or otolith stimulation, constitute the most reliable responses of vestibular activity which can be measured. By means of electronystagmography, these can be accurately recorded on moving graph paper. Quantitative expression of the responses, however, can be most time-consuming when one attempts to average the slopes of the slow phases of the nystagmus induced by any experimental or pathologic vestibular activity. In order to overcome this diffi-

culty, attempts were made to develop a computer which might give an instantaneous "read-out" of the vestibular activity. Considerable time has been devoted to this over the past twelve months and a prototype device has just been completed which demon-

strates that an appropriate instrument is definitely feasible for clinical use.

At St. Michael's Hospital, Drs. Brydon Smith and Walter Johnson have continued their research on the non-auditory labyrinth. The main developments have consisted of the production of improved electronic recording devices to facilitate the quantitative expression of pathologic and laboratory-induced nystagmus and the development of improved surgical procedures designed to inactivate different portions of the organ of balance thereby aiding in more complete understanding and accurate diagnosis of vestibular lesions. The acquisition of appropriate equipment to enable this research was supplied to the hospital through the generosity of the Atkinson Foundation. Drs. T. Molony and Philip Smith have taken preliminary steps to initiate an investigation of appropriate surgical procedures involving crush injuries of the larynx.

At the new Wellesley Hospital, preliminary plans have been formulated to enable the development of suitable test procedures for the diagnosis of labyrinthine disease.

Additional research has been carried on through the co-operation of the Department of Physiology of the University. Dr. David Briant has worked with Dr. John Scott in attempts to implant electrodes in different portions of the eighth cranial nerve. The success of his research has added to our knowledge of the central distribution of the different vestibular receptors.

Dr. Yuichi Nito from Japan has completed an investigation dealing with the importance of the different vestibular receptors in positional alcohol nystagmus. The application of a surgical procedure developed by Dr. Kenneth Money of the Defence Research Medical Laboratories has made it possible to establish the importance of

the semicircular canals in this condition.

Dr. Gosta F. Dohlman, a Visiting Professor from Sweden, has continued with his electronmicroscopic studies to determine the origin and circulation of endolymph. This research was sponsored by the National Institutes of Health of the United States and the results were presented before the International Congress of Otolaryngology in Tokyo. These findings add greatly to our fundamental knowledge of the functions of the organ of balance both in health and disease. Also through the co-operation of the Defence Research Medical Laboratories some very significant experiments were carried out with Dr. Walter Johnson and the results provide a significant contribution to the aetiology of Ménière's disease. It was established that nystagmus could readily be produced in experimental animals by the sudden increase in potassium concentration of the perilymph thereby causing depolarization of the nerves attached to the semicircular canals. The results were also presented in Tokyo at the annual meeting of the Collegium Otolaryngologicum and for this research Dr. Dohlman received the George Shambaugh prize.

Experiments with radioactive labelled sodium demonstrated the functional signi-

ficance of specific cellular receptors in the semicircular canals.

The use of a torsion swing provided by the Defence Research Medical Laboratories enabled a determination of the location of cholinergic chemical mediators and enabled an understanding of both inhibition and stimulation of the semi-circular

canals by chemical means.

In co-operation with the University Departments of Bio-medical Electronics and Physiology, an intensive investigation has been initiated to determine the autonomic effects of strong vestibular stimulation. This research, which is being supported by a grant from the Defence Research Board of Canada, had considerable practical applition in operational military situations and also concerns the welfare of astronauts in space travel. Activity to date has been concerned with the development of a special type of television eye movement recorder to furnish objective signs of stimulation of the labyrinth. Drs. Lewellyn Thomas and Walter Johnson control this project and are to be assisted by a graduate student.

The continued investigation of methods of the assessment of hearing in infants and small children has proceeded under the grant of Mr. E. C. Fox. In order that the use of evoked responses by means of E.E.G. equipment could be made more practical, a new piece of equipment has been evolved. This consists of a new computer especially developed for this purpose by Dr. J. W. Scott and the electronics division with the complete machine concentrated in a small portable unit.

This was presented by the Head of the Department at the International Congress in Tokyo where it has evoked great interest. Patents are pending and manufacture should soon be started in the near future. This should provide an effective and relatively inexpensive means of assessing hearing in this very young group of patients.

Publications

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— "Preparation of Man for Travel into Space" (Proceedings of the Royal Society of Medicine, vol. 59, no. 3, March, 1966, pp. 277-80).

— "Suppression of Motion Sickness by Thiethylperazine (Torecan)" (Aerospace Medicine,

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PAEDIATRICS

Under the direction of Professor A. I. Chute

A great deal of time was devoted by the staff to considerations of the teaching programme in the hospital. Study of the curriculum and future integration with preclinical science is continuing. The postgraduate experience of residents is being broadened to include an increasing amount of training in subspecialties of paediatrics.

It is increasingly evident that the need for teaching space is becoming critical. Hopefully the projected building programme will alleviate this shortage in the future. Teaching rooms are in constant demand not only for third and fourth year medical students, but for the large number of residents-in-training at the hospital. Specialty departments and ward services conduct weekly teaching sessions which are an important part of the postgraduate programme of the hospital. The inadequate facilities in the medical outpatient department for teaching purposes as well as for patient care make a critical situation which should be remedied in the near future.

The paediatric staff has continued the Jamaica project and Drs. A. L. Chute and John Keith visited the paediatric department of the University of the West Indies acting as specialist consultants to the teaching and patient service of that institution. A new service project was inaugurated by Drs. John MacLean and Martin Wolfish who visited several of the islands in the Caribbean under the postgraduate programme of the University of the West Indies giving lectures and clinics to physicians practising in the islands. This proved to be very successful and is to be continued in the future.

Another senior staff paediatrician retired during the year. Dr. Harold Edwards served the hospital as a senior resident, resident-in-chief and a member of the staff for nearly forty years. His conscientious and dedicated service to the hospital will be missed, particularly as a senior head of service.

The postgraduate programme has continued and the following courses were offered to specialist paediatricians and general practitioners: Clinical Paediatrics (2); Problems of the Adolescent; Problems of the Newborn and Premature; Paediatric Allergy. The hospital continues to attract a considerable number of physicians from other countries seeking postgraduate training in paediatrics. Physicians from the following countries were in attendance as full-time postgraduate trainees during the year, Kenya, Indonesia, Jamaica, Nigeria, England, Scotland, Thailand, Korea, Formosa, Greece, Philippines; Ghana, India, United States, Ireland, Venezuela, Egypt, Nicaragua, Colombia, Mexico. In addition, the Colombo Plan assigned six physicians to the hospital for specialty training.

Dr. A. L. Chute, Professor and Head of the Department of Paediatrics, this year's winner of the Sir Arthur Sims Travelling Professorship, left on January 7 on an extended tour of Great Britain, India, South Africa, Italy, Australia and New Zealand, visiting hospitals and medical schools en route. During the trip, from which he returned in early May, Dr. Chute delivered lectures on the following topics: "Ideopathic Hypoglycaema of Infancy and Childhood," "Aids in the Diagnosis of Genetic Disorders," "Failure to Thrive," and "A Philosophy of Management of

Juvenile Diabetes."

Dr. J. H. Ebbs was honoured by being elected Vice-President of the American Pediatric Society, and was a delegate to the Eleventh International Congress of Pediatrics in Japan. Following the meeting Dr. Ebbs visited former University of Toronto trainees in Hong Kong, Thailand, Malaya and India, and conducted a number of postgraduate teaching sessions.

Dr. J. S. Prichard was elected a Fellow of the Royal College of Physicians of

London.

SCHOLARLY ADDRESSES

Dr. N. Aspin, International Symposium on the Biochemistry of Copper, Harriman, N.Y., Dr. R. S. Fowler, Symposium on Heart and Circulation in Newborn and Infant, Chicago; Canadian Cardiovascular Society, Winnipeg. Dr. J. D. Keith, Symposium on Heart and Circulation in Newborn and Infant, Chicago, Hartford, Connecticut; Gainesville, Florida. Dr. B. S. L. Kidd, Canadian Federation of Biological Societies, Ottawa; Canadian Paediatric Society, Winnipeg. Dr. P. D. McClure, Queen's University postgraduate lecture course. Dr. J. S. Prichard, various lectures in Bangkok; University of Cairo, Egypt; University of Saskatchewan, Saskatoon; Montreal Neurological Society; Conference on Epilepsy at Cleveland, Ohio. Dr. I. Radde, University of Frankfurt, Germany; Canadian Society of Clinical Investigation, Toronto; Royal College of Physicians and Surgeons (Canada), Toronto; American Society of Pediatric Research, Philadelphia. Dr. B. SARKAR, University of London, England; University of Gothenburg, Sweden; University of Copenhagen, Denmark; University of Calcutta, India; Benares Hindu University, Benares, India; Ciba Research Center, Goregaon, Bombay, India; University of Philippines, Manila, Philippines; University of Tokyo, Tokyo, Japan; University of Southern California, Los Angeles; International Symposium on the Biochemistry of Copper, Harriman, N.Y. Dr. A. Sass-Kortsak, European Club of Pediatric Research, Manchester, England; International Symposium on the Biochemistry of Copper, Harriman, N.Y. Dr. P. Swyer, Air-Shields, Inc., Hatboro, Pennsylvania; Canadian Paediatric Society, Ottawa; National Institute of Health Conference, Rockville Pike, Maryland; Chicago Medical Society, Chicago. Dr. M. W. Thompson, Genetics Society of Canada, Guelph; Bar Harbor, Maine; Dalhousie University Medical School.

RESEARCH

Research activity within the Department continues to increase, limited only by the funds available to support it. We are deeply indebted to the outside granting agencies for their support, in particular the Medical Research Council, the Department of National Health and Welfare, the Ontario Heart Foundation, the Hartford Foundation and many others.

The work can be listed under various headings.

Allergy. Dr. C. Collins-Williams has continued his studies of the allergic diathesis and in collaboration with Dr. M. Moscarello has carried out studies on the serum

protein abnormalities in intractable asthma.

Cardiology. Dr. John Keith has continued his studies into the natural histories and characteristics of a wide variety of types of congenital heart disease with special emphasis on ventricular septal defect and transposition of the great vessels. Dr. Rodney Fowler has started an analysis of the vectorcardiogram as an aid in assessing these patients. Dr. Langford Kidd has continued his haemodynamic investigations in tetralogy of fallot, ventricular septal defect and transposition of the great vessels, with special attention to the effects of various pharmacologic agents on dynamics of shunts and stenoses. He also continued his studies in hypothermia in newborn pigs.

Endocrinology. Dr. J. D. Bailey and his group have continued in the study of growth failure by radio-immuno-assay of growth hormone. This project has been concentrating on the study of infants with low birth weight for gestational age. The radio-immuno-assay of growth hormone technique has been established by Dr. Gagliardino, under the supervision of Dr. Julio Martin. In association with Dr. S. H. Jackson, the metabolic effects of growth hormone in hypopituitary children are evaluated by measuring urinary hydroxyproline excretion. Dr. R. Ehrlich, with Dr. Julio Martin, continued his work on the problems of hypoglycaemia.

Genetics. Dr. Margaret Thompson continued her work in physiological genetics

in relation to Duchenne muscular dystrophy and hereditary murine anaemias.

Haematology. Dr. Peter McClure is studying thrombopoiesis in thrombocytopenic purpura, the use of Amican in open-heart surgery to control bleeding, the antihaemophilic globulin levels in haemophilic carriers and the treatment of iron-overloading in thalassemia with desferrioxamine. Dr. John Darte and Dr. Marion Sonley are continuing their investigations with chemotherapeutic agents in malignant disease.

Metabolic Disease. Dr. Donald Fraser and his group continued their studies into calcium and phosphorus metabolism and renal function. Dr. Ingeborg Radde is studying magnesium metabolism in patients with malignancies, particularly acute leukaemia before and after specific anti-leukaemic therapy, and calcium homeostasis by parathyroid hormones and experimental hyperthyroidism. Dr. A. Sass-Kortsak in association with Dr. N. Aspin and Dr. B. Sarkar has continued studies on copper metabolism. Dr. N. Aspin has continued the development of the scintillation camera for radiocopper studies in patients and animals with Wilson's disease. Dr. B. Sarkar has started studies concerning the biological transport of iron. Dr. A. Sass-Kortsak, in association with Dr. J. L. Weber, continued his studies of liver disease in children and in association with Dr. S. H. Jackson, studies of amino acid metabolism. Dr. William Hanley is studying growth and development in phenylketonuria. Dr. Douglas Crozier continued his clinical research on fibrocystic disease. Dr. C. P. Rance continued his studies on children with renal disease. Biopsy specimens were obtained in selected cases and examined by light microscopy, and by Dr. P. Conen using electron microscopy. Histo-chemical analysis of the biopsy specimens from children with nephritic syndrome is being carried out with Dr. A. Chalvardjian.

Neonatology. Dr. Paul Swyer and his group continued their studies into the pathophysiology of the idiopathic respiratory distress syndrome and other problems

of the newborn period.

Neurology. Dr. J. S. Prichard and his group continued their clinical studies into convulsive disorders, phosphorus metabolism in cerebral hypoxia of newborn and the follow-up of petit mal.

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PATHOLOGICAL CHEMISTRY

Under the direction of Professor J. A. Dauphinee

Undergraduate Teaching. No important changes have been made during this current session in the subject-matter dealt with in the lectures given to the students in Pathological Chemistry in the third medical year, except of course for the addition of new material which is continuously being introduced in connection with the many recent developments in our field. The lecture course has included general and specific presentations of the biochemical abnormalities and disturbances which may occur in the metabolism of electrolytes, water, acid-base, carbohydrates, lipids, bile pigments, calcium, phosphorus, uric acid, hormones, amino acids and proteins in a wide variety of acquired and inherited illnesses. In these lectures the basic underlying causes for the appearance of these abnormalities are emphasized along with the ways by which they may be recognized, what they mean, how they affect the patient and how they may be further studied and investigated. The lecture series also includes a short introduction of the role of immunochemical disturbances in disease and discussions of the disturbances in function which may take place in the various diseases of the liver, kidney, gastrointestinal tract, endocrine and other organs, and the various procedures which may be used to determine the extent to which the functions of these organs are disturbed in any given patient. In every instance the biochemical findings are correlated as closely as possible with the clinical aspects of the condition under discussion. In the laboratory classes, in which the subject-matter follows very closely that of the lectures, the tendency to substitute small group discussions, seminars and demonstrations for certain portions of the quantitative analytical work, previously carried out by the students themselves, has continued. The widespread introduction in routine hospital laboratories of automated procedures for the quantitative determination of almost every important constituent of the blood and other fluids has markedly decreased the amount of laboratory work which is now being done by the older classical chemical procedures and, at the same time, these automated methods have increased tremendously the amount of biochemical information which is being made available to physicians about their patients. If full advantage is to be taken of this mass of biochemical information it is essential that the physician be well informed about the precise significance and interpretation of all the many results which are being sent to him from the clinical chemistry laboratory. The great importance of the accurate evaluation of laboratory results is emphasized with our students during the laboratory periods in frequent small group seminars and discussions. Each student is provided with a short account of the clinical history and physical findings of a specific clinical case. The student carries out a small amount of laboratory work himself on specimens provided for the purpose and he is also supplied with the details of all the other pertinent laboratory data obtained during the complete investigation of the patient. The student then presents the clinical aspects of the patient and all the biochemical findings to a small group of his fellows under the guidance of a demonstrator and the significance of each normal and abnormal finding is fully and critically discussed by the group in relation to the other laboratory results, to the patient as a whole and to the disease from which he is suffering. Questions relating to the adequacy of the quality control in the laboratory, the range of normal values, and the importance of possible biological variations are dealt with as well as are the many possible reasons and mechanisms-pathological and otherwise—for the finding of an abnormal result in a given patient. It is felt that the students derive much more benefit from this kind of exercise than they would from the performance themselves of a large number of biochemical determinations.

Graduate Teaching. Five graduate students have been registered in the Department for advance degrees in the School of Graduate Studies during the past year, three for the Ph.D. degree and two for the M.Sc. degree. Two other students have been taking work in Pathological Chemistry as a part of their graduate programme

in other departments. Of the Ph.D. candidates, Dr. Chi-tao Chou, working under the direct supervision of Professor Cinader in the field of immunochemistry, completed his thesis, entitled "The Immune Response of Very Young Rabbits to Human Serum Albumin," as well as the other requirements, and was awarded his degree at the February meeting of the Senate. Dr. Chou was also awarded the Stuart Alan Hoffman Memorial Prize for 1965 in recognition of the excellence of the research work which formed the basis of his doctoral thesis. In addition to these advanced degree students, four others have been engaged in programmes leading to the B.Sc. (Med); two of these are medical graduates and two are medical undergraduates who are earning the degree by working in the Department for three successive summers.

The graduate course "Selected Topics in Pathological Chemistry" (two hours weekly during the session: Course 1004 in the Graduate School Calendar) was presented this year by various members of our staff. The purpose of this course is to provide graduate students with an opportunity for detailed and critical discussion about various new research areas, or "frontiers of research," with members of the staff who have been particularly interested or involved in investigations of the pathochemistry and/or pathophysiology of a particular disease process. Among the topics dealt with during the present session were: (1) "Inborn Errors of Metabolism" (Dr. A. Malkin), (2) "Whole Blood Colorimetry" (Dr. W. Paul), (3) "Present Knowledge of Adrenocortical Hormones with Special Reference to Aldosterone" (Dr. A. G. Gornall), (4) "Some Current Research Problems in Immunochemistry" (Drs. Cinader and Dubiski), (5) "Perspectives in Experimental Hypertension" (Dr. D. Ostrovsky) and (6) "Recent Advances in the Knowledge of Renal Function" (Dr. T. F. Nicholson).

The Advanced Graduate Course in Clinical Chemistry (No. 1005) was given this year under the immediate direction of Dr. C. J. Porter (Head of the Division of Biochemistry at the Toronto General Hospital) and Dr. D. Michener Schatz with generous assistance from Dr. S. H. Jackson (Head of the Biochemistry Laboratories in the Hospital for Sick Children) and Dr. A. Rapoport (Director of the Biochemical Laboratories at the Toronto Western Hospital). Each of these teachers, in addition to their hospital post, holds a senior cross-appointment in our Department. This course is designed especially to equip students with the practical and theoretical knowledge necessary for those who wish to direct a large hospital clinical laboratory and consisted this year of some thirty lectures ($1\frac{1}{2}$ hours each) and sixty hours of laboratory work and demonstrations. In addition to dealing with all the standard techniques, many of which are now carried out by automated procedures, instruction was given in atomic absorption spectrophotometry, emission spectrophotometry (including theoretical considerations of flame photometry), fluorometry and the principles of micro and ultra micro analytical techniques. The course was attended by 7 students with B.A. or B.Sc. degrees, by 6 M.D.s proceeding to a higher qualification in Clinical Pathology and by some 15 chief and senior techologists who, already having had considerable practical laboratory experience, wished to acquire further competence in the specialty of clinical chemistry. As in the past the course was oversubscribed and it was not possible to enrol more than about half of the qualified applicants.

In this connection Dr. Porter, Chairman of the Quality Control Committee and Secretary of the Certification Committee of the Canadian Society of Clinical Chemists, and Dr. Schatz, Secretary of the Society, attended a Symposium on the "Training of Clinical Chemists" held by the Society at its recent annual meeting in Winnipeg where Dr. Porter was one of the scheduled participants. There is great need in Canada and elsewhere for increased numbers of well-trained clinical chemists to meet the rapidly expanding demand for laboratory services by hospitals and other institutions and it is hoped that a comprehensive scheme for their training both at

the undergraduate and at the graduate level can be developed.

Postgraduate Teaching. The highly concentrated two-week annual course in Radioactive Isotopes, sponsored by the Division of Postgraduate Medical Education,

was given for the tenth time, in May again this year, under the direction of Dr. W. Paul, with generous assistance from the members of the staff in Biochemistry and other departments. Physicians who wish to use isotopes as investigative or therapeutic tools in the handling of human patients must first be granted a licence to do so by the Canadian Atomic Energy Control Board and the taking of this course on Radioactive Isotopes (or of one like it) is one of the necessary steps for those who wish to obtain such a licence. In addition such persons must have had adequate clinical training and specified periods of experience in the handling and uses of isotopes under the direction of qualified users. The course provides, by lectures, demonstrations and practical work, basic instruction in (1) the physics, mathematics, chemistry and the biological effects of radioactive isotopes, (2) the methods by which they are handled, detected and quantitatively measured and (3) the ways that they may be used as investigative, diagnostic and therapeutic tools. The course this year was attended by 29 physicians who came, not only from the local area, but also from other parts of Canada from Halifax to Victoria, and by 14 medical students who took the course as a part of their programme for obtaining the B.Sc. (Med) by work and study in a basic science department of the University for three consecutive summers. As usual it was not possible to register all those who applied and in order to meet the demand for training in the uses of radio isotopes serious thought is being given to offering a similar course, spread throughout the year, to meet the local requirement, leaving the concentrated period in the spring for those coming from a distance who must obtain their training in a limited period of time.

With the help of the Ontario Antibody Club and with financial assistance from the Medical Research Council, the Canadian Arthritis and Rheumatism Society, the National Cancer Institute of Canada, the Gairdner Foundation and the Division of Postgraduate Medical Education of the University of Toronto, Dr. Cinader organized the very successful international symposium on the "Regulation of the Antibody Response" which was held in Toronto, January 20–22, 1966. This symposium was attended by over four hundred physicians and other scientists interested in antibodies and the programme included papers by specialists in this field from England, Sweden and the United States as well as from Canada. Dr. Cinader also took part in the postgraduate course on "Immunity, Inflammation and Hypersensitivity" given here in Toronto on March 29, 1966, under the auspices of the American College of

Physicians.

Various other members of our staff have also taken part in other postgraduate teaching programmes such as the Five O'Clock Lecture series given for residents and internes at the Toronto General Hospital and the six-week advanced postgraduate course given by our medical school in the late summer for Fellowship candidates and others.

Staff. Professor T. F. Nicholson returned to the Department at the beginning of the present session after two and a half years on leave of absence during which he set up and developed the Department of Pathology at the new medical school at Lagos in Nigeria. We welcome him home. Dr. A. Malkin, Head of the Biochemistry Laboratories at Sunnybrook Hospital and previously an Associate in Pathological Chemistry, has been appointed to the rank of Assistant Professor in our Department and Dr. A. Rapoport, Director of the Biochemical Laboratories and of the Metabolic Renal Unit at the Toronto Western Hospital, was similarly promoted a year ago. The Heads of the Clinical Chemistry Laboratories in the Toronto General Hospital (C. J. Porter, Ph.D.), the Hospital for Sick Children (S. H. Jackson, Ph.D.), the Toronto Western Hospital (A. Rapoport, M.D., M.A., F.R.C.P.(C)) and Sunnybrook Hospital (A. Malkin, M.D., Ph.D.), now all hold cross-appointments with senior academic rank in the Department of Pathological Chemistry of the University and all of them take an active part in our undergraduate and graduate teaching programmes. It is hoped that this liaison between our Department and the clinical chemists in the other teaching hospitals in Toronto can be still further extended. Dr. D. Ostrovsky, who has served as a lecturer in the Department during the past year, has been appointed as a Research Associate in the Research Division of the Cleveland Clinic where he will be working with Dr. I. H. Page, Dr. R. Smeby and other members of this research group on "Factors Influencing the Action of Renin in Normotensive and Hypertensive States," an area of investigation closely allied to the one in which he has been working during his pre- and post-doctoral years in our Department. It is hoped that after this further period of post-doctoral experience it

will be possible for us to attract Dr. Ostrovsky back to Toronto again.

In addition to his many other activities Dr. Gornall this year has continued to devote a great deal of time to exploring the role which the Department of Pathological Chemistry should play when, in the near future, the number of students in our medical school is considerably increased and all the teaching of the final two years, including that of Pathological Chemistry, will be given to four separate groups of students by four separate groups of teachers at four separate teaching hospitals in the City. He has proposed and circulated to interested parties a plan in which the interests and activities of the Department, as a department in the University and School of Graduate Studies, are integrated with the interests and activities of the teaching hospitals. This plan seeks to provide an appropriate balance of responsibility to both the University and the hospitals for undergraduate and graduate teaching, research and graduate student training, the clinical chemistry service and the development of clinical chemists. Its fundamental tenets are to provide an academic home for biochemists in the hospital environment where basic and medically qualified scientists have equal opportunity for career development. The plan is a good one and should be given serious consideration.

Professor Dauphinee resigned as Head of the Department, as of June 30, 1966, after nineteen very happy years. He will remain on the staff for a further short period devoting his time mainly to teaching, writing and research. He regretted very much taking this step but felt strongly that the one directing the Department at the present time should be a younger person and one who will not only have a voice in planning the future role of the Department in the coming days of the rapid expansion of our Faculty but will also be actively associated with the new system after it has been established. It was with great pleasure that he and the other members of the staff learned that Dr. Gornall had been appointed the new Chairman of the Depart-

ment. We all wish him every success.

SCHOLARLY ADDRESSES

Britton, A., Rosen, F., Volpe, R. and Ezrin, C. "Studies on the Determination of Serum Thyroxine in Human Serum," Canadian Federation of Biological Societies, Vancouver, June 8, 1966. Dauphinee, J. A. "The Sea Within Us," Presidential Address, Royal Canadian Institute, Toronto, November 6, 1965. Gornall, A. G. "Some Curious Effects of the Hormone Aldosterone," Invited Paper, Royal Society of Canada, Sherbrooke, June 6, 1966. Liew, C. C. and Gornall, A. G. "Metabolic Effects of Aldosterone in the Rat Heart," Canadian Federation of Biological Societies, Vancouver, June 8, 1966. Ostrovsky, D. and Gwizdal, M. "Corticosteroids and Contractile Performance of Rat Heart Papillary Muscles," Canadian Federation of Biological Societies, Vancouver, June 8, 1966.

RESEARCH

Reported by Professor J. A. Dauphinee

It is a pleasure to acknowledge with sincere thanks the generous grants-in-aid for research which have been received by all senior members of the Department from the Canadian Medical Research Council, the Ontario Heart Foundation and the Ontario Cancer Treatment and Research Foundation.

Mr. C. E. Downs and Dr. J. A. Dauphinee, with the collaboration of Dr. J. C. Richardson and other members of the Neurological Service of the Toronto General

Hospital, have continued their investigations of the copper metabolism in a number of different neurological diseases, paying special attention to those which have certain features resembling those found in patients with Wilson's Disease, the inherited condition in which there is a well-known abnormality in the metabolism of this metal. With the co-operation and help of Dr. W. Paul, this investigation is being extended to a study of the metabolism of other trace metals in these illnesses. For this purpose, chemical and atomic absorption spectrophotometric methods are being set up by Mr. Donald Prior (one of our B.Sc. (Med) students), and neutron activation procedures have been explored by Mr. Michael Sole, for the quantitation of a number of these elements in blood and urine. Permission to use the swimming-pool reactor at McMaster University for the activation of samples and the acquisition (with the help of a major equipment grant from the M.R.C.) of a 400 Channel Pulse Height Analyser should permit this latter technique to be successfully applied to this problem.

Dr. S. H. Jackson and Mr. T. G. Elliott (one of our M.Sc. students) have been studying the metabolic effects of burns by investigating the excretion of hydroxyproline in the urine which follows this form of trauma. Miss Amy Britton, working in association with the Thyroid Research Group of the Department of Medicine, has developed a simplified method for the determination of plasma thyroxine (T_4) . This procedure, the details of which were presented to the ninth annual meeting of the Canadian Federation of Biological Societies at Vancouver in June 1966, should be of considerable interest to those concerned with the investigation of thyroid function. Dr. Saul Cohen has continued his investigation of oestrin excretion in normal and complicated pregnancies and he has also been attempting to develop a technique for the assay of this hormone which can be applied to non-pregnancy urines. Mr. Hillar Vellend, another of our Summer B.Sc. (Med) students, working under the direction of Dr. Cohen, is studying the urinary excretion of oestrogen sulphates in normal and

pathological pregnancies.

Dr. B. Cinader and Dr. Chi-tao Chou (one of our Ph.D. candidates), in collaboration with Dr. S. Dubiski, have studied immunoglobulin chimaerism in rabbits which at birth have been given cells from spleen, thymus, lymph nodes or from peritoneal exudates, and in which the products of the transferred cells are followed by virtue of genetic markers. Up to 20 per cent of the animals injected with thymus cells became chimaeric in that they produced immunoglobulins which carried the genetic marker of the donor for the entire observation period. Dr. Chou was awarded his Ph.D. degree in February 1966, his thesis being entitled "The Immune Response of Very Young Rabbits to Human Serum Albumin." Mr. J. E. M. St. Rose, another of our Ph.D. students also working under the direction of Dr. Cinader, is investigating various aspects of "Acquired Immunological Tolerance in Rabbits to Human Serum Albumin."

Dr. T. F. Nicholson has been investigating further the methods by which the kidney handles inorganic phosphate. By infusing phosphate in animals undergoing an osmotic diuresis it has been possible to show definitely that there is active secretion of phosphate by the renal tubules. Confirmatory evidence for the secretion of phosphate by the distal tubules has also been obtained histochemically using nephrons

isolated by microdissection.

In our Isotope Laboratory, among other studies, Dr. W. Paul has been investigating, in conjunction with the Institute of Bio-Medical Electronics, the possible usefulness of optical image intensifier tubes and sodium iodide scintillators for the demonstration of gamma rays. The optical gain of the first two-stage model was insufficient to demonstrate a clinical radioactive distribution but the necessary minimum specifications for a new first stage "Intensifier" have been derived and the construction of a tube with its unique properties is being negotiated. He has improved his ear oximeter by the introduction of a new transistor type of photocell for the measuring device and is experimenting with a beam-splitting light source provided by the R.C.A.F. He has developed a reflection type of colorimeter for the measurement of skin blanching and this is being used, in co-operation with Dr. Walter

Johnson, in the investigation of patients in the Vertigo Laboratory of the Department of Otolaryngology.

Reported by Professor A. G. Gornall

Research on fundamental aspects of the pathochemistry of hypertension has been extended by the following studies.

Dr. D. Ostrovsky has extended his research on the effects of adrenal hormones on the cardiovascular responsiveness of rats to angiotensin, renin, noradrenalin and vasopressin. He has also studied, in collaboration with Dr. Mary Gwizdal (candidate for the B.Sc. (Med) degree), the contractile behaviour of heart papillary muscle from adrenalectomized, intact and hormone treated adrenalectomized rats. Both of these studies have revealed that aldosterone acts synergistically with other adrenal hormones to influence cardiovascular function. Mr. Gordon Weisbrod, M.R.C. summer scholar, and Miss Teresa Markowitz, medical student from Poland, have assisted with these studies.

Mr. C. C. Liew, candidate for the Ph.D. degree, has undertaken a biochemical approach to the effects of hormones on heart muscle function. Using rat heart slices he has found that adrenalectomy results in an increase in oxygen uptake but a fall in glycogen content. Both these changes can be reversed completely by the administration of aldosterone. Using homogenates of heart muscle changes in adenosine triphosphate, glucose-6-phosphate dehydrogenase, and the pathways of glucose metabolism have been shown to be partially reversible when this hormone is administered. Mr. F. Carmichael and Miss M. Choong have provided able assistance with this work.

Miss Sylvia Kovacs, candidate for the M.Sc. degree, has successfully demonstrated the synthesis by the perfused rat liver of a substance with the properties of renin substrate. A final effort is being made, in collaboration with Mrs. M. Kandel, to prove that the pressor substance released is angiotensin.

Mrs. B. J. Cadeau has continued her studies on aldosterine uptake by tissues in relation to the mechanism of action of this hormone. Neither adrenalectomy, nor the prior administration of relatively large amounts of aldosterone, has had any effect on the uptake and release of tritium labeled aldosterone by tissue cells. No evidence of significant binding by receptor sites has been found. It is believed that the intracellular hormone is in equilibrium with the "free" fraction of aldosterone in the plasma.

Mrs. M. Kandel has spent much of her time developing techniques for the separation of proteins and peptides for the purpose of establishing their amino acid content using our new amino acid analyser.

Mrs. Janis Grant has perfected the bioassay for angiotensinogen in serum and has undertaken a study of factors that may regulate the level of this renin substrate in the blood. Mr. M. Luke has assisted with this work and has also developed techniques for the separation and measurement of aldosterone and tetrahydroaldosterone using gas chromatography. With these techniques it is hoped to complete the work done last year by Dr. B. W. Thomas on the secretion of aldosterone by hypertensive dogs.

Publications

ABBOTT, E. C., GORNALL, A. G. SUTHERLAND, D. J. A., STIEFEL, M. and LAIDLAW, J. C. "The Influence of a Heparin-like Compound on Hypertension, Electrolytes and Aldosterone in Man" (Canadian Medical Association Journal, vol. 94, no. 22, May 28, 1966, pp. 1155-64).

BAINES, A. D. "Cell Renewal following Dichromate-induced Renal Tubular Necrosis: An Enzyme Histochemical Study" (American Journal of Pathology, vol. 47, no. 5, Nov., 1965, pp. 851-76).

BRITTON, A., WEBSTER, B. R., EZRIN, C. and VOLPE, R. "The Association of I¹³¹ labelled Thyroxine and Tri-iodothyronine with Serum Proteins after Starch Gel Electrophoresis" (Canadian Journal of Biochemistry, vol. 43, 1965, pp. 1477-87).

Britton, A., Rosen, F., Volpe, R. and Ezrin, C. "Studies on the Determination of Serum Thyroxine in Human Serum" (Proceedings of the Canadian Federation of Biological Societies, vol. 9, June 8-10, 1966, p. 60) (Abstract).

Gornall, A. G. and Cadeau, B. J. "Tissue Radioactivity after the Injection of Tritiated Aldosterone in Rats" (Excerpta Medica International Congress Series, no. 99, 1965, p.

E115).

LIEW, C. C. and GORNALL, A. G. "Metabolic Effects of Aldosterone in the Rat Heart" (Proceedings of the Canadian Federation of Biological Societies, vol. 9, June 8-10, 1966, p. 45) (Abstract).

NICHOLSON, T. F. (with Collis, W. R. F. and Audu, I. S.) "Manpower Needs and Medical Education in Nigeria" (British Medical Journal, vol. 1, no. 5490, March 26, 1966, pp.

OSTROVSKY, D. and GWIZDAL, M. "Corticosteroids and Contractile Performance of Rat Heart Papillary Muscles' (Proceedings of the Canadian Federation of Biological Societies, vol. 9, June 8-10, 1966, p. 45) (Abstract).

WRIGHT, L. A. and NICHOLSON, T. F. "The Distal Tubular Handling of Ninhydrin-Positive Substances" (Canadian Journal of Physiology and Pharmacology, vol. 44, no. 3, May, 1966, pp. 435-41).

- "The Plasma Levels, Filtered Loads, Excretion Rates and Clearances of a Number of Ninhydrin-Positive Substances by Normal Fasting Dogs" (ibid., no. 2, March, 1966, pp. 195–201).

"The Proximal Tubular Handling of Amino Acids and other Ninhydrin-Positive

Substances" (ibid., pp. 183-93).

- "Some Ninhydrin-Positive Substances in the Plasma and Urine of the Dog" (ibid., vol. 43, no. 6, Nov., 1965, pp. 961-9).

PATHOLOGY

Under the direction of Professor A. C. Ritchie

During the year, the pattern likely to be adopted in the new decentralized medical school has become clearer and the problems before the Department more obvious and more urgent. It seems certain that to fulfil the demands of the new curriculum, particularly for teaching in small groups, all the teaching hospitals will need much more staff, much more space and much better facilities. To meet these requirements in the short time that remains will be very difficult. By 1970, each teaching hospital should have not only the staff, space and facilities to teach well the undergraduate students in medicine allotted to it, but staff, space and facilities to provide an excellent clinical service in pathology; staff, space and facilities to train well residents specializing in pathology; and staff, space and facilities to develop the research programme essential to maintain the quality of clinical work and teaching and to permit expansion of the work of the Graduate Department of Pathology in the School of Graduate Studies. In none of these areas are our present facilities adequate, our present space sufficient, or our staff large enough, even for the needs of today. In addition, it must be remembered that the Department is charged also with the course in General Pathology for medical students, and with courses in Pathology for dental students and other students in the health sciences.

Particular note should be taken of the need to train more men to be pathologists. As has been stressed by several recent reports, the need for pathologists in the province and country is great and is likely to increase. This University and the hospitals associated with it should take their full share in training these men and in

training them better.

During the year, the undergraduate courses in General Pathology and Special Pathology have continued much as in the past, but with still more emphasis on group-teaching. It seems clear that instruction by lecture followed by demonstration or discussion with small groups of students is satisfactory and that large practical classes, and perhaps even the discussion of cases with large groups of students, have little place. It is equally clear that two difficulties have prevented our providing the kind of group-teaching that would be desirable. Shortage of staff has made it impossible to make the groups small enough. Probably they should be of not more than ten students if the instructor is to establish a direct realtionship with each student. And, secondly, the instructors must be senior and should have direct, day-to-day contact with clinical pathology. Junior men do not have the breadth of experience or the judgment to conduct well such informal classes. Unfortunately, however, most of the senior men who might teach such classes are too busy and have too great a load of clinical work to enable them to take the considerable time needed to teach well. As might be expected, case presentations based on autopsied or surgical material have proved most popular with the students but probably the classes devoted to consideration of the nature and progression of disease, and to its effect on the patient, are more important though more difficult. Classes in which experiments were demonstrated to the students have not, with some exceptions, proved popular and seem of limited value.

The dental students have been taught in a similar fashion, by lecture and group-teaching. Here the shortage of staff has been such that most of the group-teaching has had to be allotted to senior residents and fellows. This is profitable for the residents and fellows, but it not ideal for the dental students.

The lecture course for the students of Physical and Occupational Therapy has continued, as have the courses arranged by the Canadian School of Embalming and

the Toronto Institute for Pastoral Training.

The heavy load of instruction given under the Division for Postgraduate Medical Education has also continued. The work has again fallen particularly on Dr. Anderson, who has been responsible for the course on General and Special Pathology given on Friday nights for men training in subjects other than pathology but many members of the Department have shared in the work. The time has come when this work should be reconsidered, systematized and, perhaps, extended.

Twelve graduate students were registered with the School of Graduate Studies and three were awarded the degree of Master of Arts. Four postdoctoral fellows are also working in the Department. The course in Advanced General Pathology offered under the School of Graduate Studies was given by members of the Department

assisted by members of other departments and by several visiting lecturers.

We are glad to welcome several new members to the staff. Dr. M. D. Silver has come to the Banting Institute as an assistant professor. He was formerly in the John Curtin School of Medical Research in Canberra. Dr. G. B. Lumb, Vice-President and Director of the new Warner-Lambert Research Laboratories in Sheridan Park, has been appointed an associate. In the Hospital for Sick Children, Dr. M. J. Lynch has returned to Ontario as associate pathologist, and Dr. J. U. Balis and Dr. B. Erkman have been appointed research associates. Dr. M. Binns-Smith has taken up his position as assistant pathologist at the Wellesley and Princess Margaret Hospitals, and Dr. D. Abbott has joined the staff of the New Mount Sinai Hospital as Head of its Division of Haematology and Blood Banking.

Dr. J. F. Mustard has resigned his appointment as associate professor in order to become professor and Head of the new Department of Pathology in McMaster University. We are very sorry to lose him, but are glad that he has been chosen to establish the novel kind of department of pathology planned in Hamilton, and wish him every success. We must also record with regret the resignation of Dr. S. F. Penny after long and valuable service as a demonstrator. Dr. Penny is leaving his post in the Toronto East General Hospital to take up a new post in Owen Sound. Dr. K. Gal has relinquished his appointment as Associate Director of Laboratories at the New Mount Sinai Hospital to take a position in the Albert Einstein Medical Center in New York and Dr. Sheila Macvie has left the Division of Haematology at the Toronto General Hospital to take up a post in Buffalo. Dr. H. Shinozuka resigned as research associate to take up a post in the University of Pittsburgh. We also regret the loss of Dr. H. C. Rowsell who has had to give up his appointment as a research associate on moving to the University of Saskatchewan, Saskatoon, from the University of Guelph. Finally, we must note the departure of two visiting assistant professors

at the end of their time with us. Dr. B. M. Herbertson has returned to the University

of Cambridge and Dr. Leif Jørgensen to the University of Oslo.

Within the Department, Dr. W. L. Donohue, Dr. H. Z. Movat and Dr. J. W. Steiner have been promoted to the rank of professor and Dr. T. C. Brown to that of associate professor. Dr. P. E. Conen, Dr. C. Ezrin, Dr. M. J. Phillips, Dr. Susan Ritchie and Dr. D. W. Thompson have been appointed assistant professors and Dr. J. S. Carruthers, Dr. F. A. Jaffé and Dr. H. T. Van Patter lecturers. Dr. J. W. Steiner has accepted a further appointment as part-time Associate Dean for Student Affairs. We wish him well in this important and taxing assignment.

Many members of the Department visited other institutions formally or informally and many attended national or international meetings. Dr. Ritchie spent a week at McGill University; Dr. Ezrin was visiting scientist at the May Institute for Medical Research and the Jewish General Hospital in Cincinnati; and Dr. Young visited several centres in Europe. Other visits are recorded in the list of scholarly addresses

which follows.

The Department was fortunate to enjoy visits from many distinguished colleagues. Among those who were so kind as to give an address were Dr. V. Marinozzi of the Institut de Recherches Scientifiques sur le Cancer at Villejuif; Dr. G. Weissmann of New York University; Professor E. Benditt of the University of Washington; Dr. C. O. Carter of the Hospital for Sick Children, Great Ormond Street; Dr. Victor Dubowitz of the Institute for Muscle Disease, New York and the University of Sheffield; Dr. E. A. Murphy of Johns Hopkins University; Professor D. L. Wilhelm of the University of New South Wales; Dr. D. D. McGregor of Western Reserve University and Dr. G. B. Pierce of the University of Michigan.

SCHOLARLY ADDRESSES

Dr. J. H. Crookston, with B. E. E. Croucher, "A Delayed Hemolytic Transfusion Reaction Simulating Auto-Immune Hemolytic Anemia," Michigan Association of Blood Banks, Detroit, Mich., Oct. 1965; with R. F. Bakemeier and J. P. Leddy, "Structural Aspects of Human Anti-Erythrocyte Antibodies," American Society of Haematology, Philadelphia, Pa., Dec. 1965; "The History and Future of Blood Transfusion," Ontario Antibody Club Seminar, Toronto, Ont., April 1966. Mrs. M. C. Crookston, "Some Observations on the li Blood Group System," Michigan Association of Blood Banks, Detroit, Mich., Oct. 1965; Red Cell Auto-Antibodies," Ontario Antibody Club Seminar, Toronto, Ont., April 1966. Dr. C. Ezrin, "Gynecological Endocrinology in Relation to Pituitary Cytology," "Pathogenesis of Graves' Disease," Saskatchewan College of Physicians and Surgeons, Sask., Sept. 1965; Lecture on Pituitary Disorders, Hamilton Academy of Medicine Annual Clinical Day, Hamilton, Ont., Nov. 1965; "Thyrotroph in Graves' Disease," Royal College of Physicians and Surgeons, Montreal, Quebec, Jan. 1966; "Pathogenesis of Graves" Disease," May Institute for Medical Research and Jewish General Hospital, University of Cincinatti, Ohio, June 1966. Dr. J. G. Humphrey, with Dr. N. B. Rewcastle, "Hyperthyroid Induced Changes in the Skeletal Muscles of Cats and Rabbits," American Neurological Association, Washington, D.C., June 1966. Dr. A.-M. Jézé-QUEL, "Studies of Candidate Viruses in Infectious Hepatitis," U.S. Army Research and Development Command, New Orleans, La., Feb. 1966.

DR. R. S. McPhedran, with Dr. N. B. Rewcastle, "Some Observations on the Ultrastructure of Polymyositis," Canadian Congress Neurological Science, Toronto, Ont., June 1966. Dr. R. D. Macdonald, with Dr. J. G. Humphrey and Dr. N. B. Rewcastle, "Familial Periodic Paralysis," Canadian Congress Neurological Science, Toronto, Ont., June 1966. Dr. H. Z. Movat, with Dr. N. S. Taichman and C. A. Lovett, "The Pathogenesis of Passive Cutaneous Anaphylaxis in the Guinea Pig and the Rat," American Association of Pathologists, Cleveland, Ohio, March 1966; with Dr. T. Uriuhara, "Acute Inflammation: IV, On the Mediation of Late Phase of Increased Vascular Permeability," International Academy of Pathology, Cleve-

land, Ohio, March 1966; with C. A. Lovett and A. C. Wardlaw, "PCA in the Rat," American Association of Immunologists, Atlantic City, N.J., April 1966; with N. L. Di Lorenzo, Dr. J. F. Mustard and G. Helmel, "Activation of Vascular Permeability Factor in Serum by Ag-Ab Precipitates," American Association of Immunologists, Atlantic City, N.J., April 1966. Dr. S. J. Peerless, with Dr. B. Newbigin, "Lindau's Disease," Canadian Ophthalmological Association, Banff, Alta., June 1966; with Dr. N. B. Rewcastle, "Shear Injuries of the Brain," Canadian Congress Neurological Science, Toronto, Ont., June 1966. Dr. M. J. Phillips, with Dr. J. Finlay, "Electron Microscopic Findings in Whipple's Disease," Canadian Association of Pathologists, Edmonton, Alta., June 1966. Dr. N. B. Rewcastle, "Etiology of Subacute Sclerosing Leucoencephalitis," Canadian Association of Neuropathologists, Saskatoon, Sask., Oct. 1965. Dr. O. F. Veidlinger, with Dr. N. B. Rewcastle, "Subacute Inclusion Body Encephalitis: The Fine Structure of the Intranuclear Inclusions," Canadian Congress of Neurological Science, Toronto, Ont., June 1966.

RESEARCH

An active research programme has been continued, though still much handicapped by lack of space and facilities. The slow progress of the new research laboratories for chemistry, tissue culture and radioautography has been particularly tantalizing. Several medical students have worked in the Department during the summer as assistants in research projects. They have been very valuable and the experience seems to have been of value to them.

Dr. Shinozuka and Dr. Ritchie continued their work on the initiating stage of carcinogenesis, with particular reference to the possibility that the carcinogen used as initiator acts on cells synthesizing desoxyribonucleic acid. Mr. Zelcer, a medical student, is assisting in this work. Dr. Rochlani continued his study of the fine structure of the human breast, and gave special attention to the nature of the myoepithelial cells.

The nature of Dr. Movat's work changed from a primarily morphological and ultrastructural study to a multidisciplinary investigation, with particular emphasis on immunology. Passive cutaneous anaphylaxis (PCA) was used as an experimental model and it was shown that depending on the type of antibody used (isolated by starch block electrophoresis and column chromatography) the underlying mechanism varied. One form elicited with γ_2 antibody is mediated by polymorphonuclear leucocyte lysosomes and another elicited with γ_2 antibody is mediated by histamine and serotonin. Dr. Taichman and Miss Lovett assisted in this work.

With Dr. Uriuhara, Dr. Freedman, Miss Wasi and Mr. Macmorine, Dr. Movat is investigating the mode of action of polymorphonuclear leucocyte lysosomes and their chemical properties. It was found that substances such as heat-killed bacteria and antigen-antibody complexes, which are phagocytosed by leucocytes, cause degranulation releasing the lysosomal contents. The early skin lesion consists first of a "bluing spot" (increase in vascular permeability) followed later by haemorrhage. In the lysosome, low molecular weight (100–10,000) basic proteins or polypeptides cause increase in vessel permeability, but no haemorrhage; however, substances of higher molecular weight (>10,000) cause haemorrhage and little bluing. The heavier component contains the acid proteases.

A third project of Dr. Movat's group deals with activation of the kinin system in the serum by antigen-antibody precipitates. The "activated" serum causes an increase in vascular permeability, contraction of the guinea-pig ileum and a fall in blood pressure. Activation seems to depend on: (1) fixation of complement; (2) activation of the Hageman factor; (3) activation of kinin-forming enzymes; and (4) inhibition of kininolytic enzymes. Work is in progress on the chromatographic separa-

tion and identification of the kinin-forming enzymes.

Dr. Steiner and Dr. Miyai continued their investigation of ethionine carcinogenesis in rats, and also studied the effects of this chemical on cells in tissue culture.

With Dr. Sadowski and Miss McKeown, Dr. Steiner investigated the methods for isolation of nuclei from liver cells, and in collaboration with Dr. Moscarello perfected the techniques for the assessment of morphological and chemical purity of nuclear and nucleolar cell fractions. Dr. Steiner and Dr. J. Laidlaw of the Department of Medicine studied the morphological changes in the adrenal cortex of rats

exposed to a heparinoid compound.

Dr. Phillips, Dr. LeBeux, Dr. Unakar and Dr. Steiner continued studies on glycogen in the neonatal rat liver. In collaboration with Dr. G. Hetenyi of the Department of Physiology, they commenced an investigation of the biochemical alterations accompanying neonatal liver glycogen depletion. Dr. Phillips also continued his investigation of the fine structure of human liver cells in various liver diseases. In collaboration with Dr. Little of the Department of Medicine and Dr. G. Hetenyi, he studied a case of fructosaemia and commenced an experimental investigation of the effect of fructose on liver cells. Dr. Phillips and Dr. J. M. Finlay of the Department of Medicine studied the fine structure of the gut in Whipple's disease.

Dr. Jézéquel, Dr. Steiner and Dr. J. C. Sinclair of the Department of Bacteriology, studied the effects of coxsackie viruses on cells in culture, and the ultrastructural effects of mycoplasmata on the nuclei of tissue culture cells. Dr. Jézéquel and Dr. Steiner continued their study of needle biopsies of the liver from patients with viral hepatitis and from human volunteers injected with candidate viruses.

Dr. Moscarello, Dr. Jézéquel and Dr. Lewin have continued to study the morphology and biochemistry of the EMC virus. Dr. Lewin and Dr. Moscarello are also studying myoglobin in normal persons and in patients with sickle cell

anaemia.

Dr. Arakawa, Dr. Steiner and Dr. Jézéquel continued a study of runt disease in mice.

Dr. Susan Ritchie, Dr. Steiner and Mr. Halloran, a summer student, commenced a study of renal lesions in patients in New Britain, in association with Dr. Kariks, a Government of Australia pathologist.

Mrs. Crookston has continued her work in immunohaematology, with particular reference to the use of blood groups as genetic markers. With Dr. Connell of the

Department of Biochemistry, she studied the li blood group system.

Dr. Anderson and Dr. Macnab of the Department of Surgery have continued to study experimentally the effect of stretch or tension on tendinous insertions, and

the effect of prolonged immobilization on the nutrition of tendons.

Dr. Young and Dr. Klotz of Ottawa have begun a study sponsored by the Canadian Association of Pathologists to determine the value of the units of laboratory work prepared by the Dominion Bureau of Standards. Dr. Young is also studying the effect of unsolicited laboratory tests on the diagnosis and care of outpatients.

Dr. Ezrin and Dr. Lakshman have continued to study the human adenohypophysis. Five cell types have been recognized electron microscopically, and these are now being correlated with the cell types seen on light microscopy. The inhibition of the pituitary seen in Graves' disease has also been studied, as has the stimulation

of the pituitary caused by clomiphene.

At. St. Michael's Hospital, Dr. Katz with Dr. Vidal and Dr. Higgins and in association with the virus laboratory of the Provincial Laboratory have been investigating biopsies and serum from patients with thyroiditis, in an attempt to identify

viruses by cultural, serological or fluorescent antibody techniques.

At the Hospital for Sick Children, Dr. Conen and Dr. Balis compared the electron microscopic appearance of the lung of infants dying with respiratory distress syndrome with that of developing lung from human foetuses, and that of premature and full-term infants. Changes due to maturation were distinguished from pathological changes due to injury and repair. In human aorta they showed that the medial lesion of coarctation was due to hyperplasia of smooth muscle cells and changes in arrangement of the elastic tissue. The normal development of the aorta

in foetal and weanling rats was studied and compared with the abnormal arrangement of smooth muscle cells and the defects of elastic tissue found in rats born to mothers fed sweet pea extract during late stages of gestation. Electron microscopic studies of development of muscle, kidney and liver in spontaneous and therapeutic abortuses were made to assist in examination in biopsies of these tissues from children.

With Dr. Erkman, Dr. Conen continued electron microscopic and chromosomal studies from several malignant tumours and from acute leukaemia in children. Abnormal chromosome patterns specific for each individual patient were found in several of these malignancies. A study of chromosome abnormalities in patients with congenital malformations, detected in the large diagnostic chromosome laboratory at the Hospital, resulted in new information on the frequency and survival-time in these chromosomal syndromes.

DIVISION OF NEUROPATHOLOGY

Last year, neuropathology was taught to the undergraduate class in medicine by lecture only, being given in a block of nine lectures at the beginning of the third medical year. To remedy the lack of practical demonstrations or seminar teaching, a group of three demonstrations of gross and microscopic pathology was added towards the end of the second medical year. It is hoped that this practical course

will prove useful when students come to lectures in their third year.

Postgraduate teaching included weekly conferences alternating between gross and microscopic demonstrations of current material and formal presentations of cases at Clinical Neuropathology Rounds. These conferences were not restricted to our own residents in training but were open to all members of the Department of Pathology and to the clinical staff. In addition, weekly seminars for residents in the various neurological sciences were held and were concerned in large part with recent advances in the neurological field. A journal club was held twice monthly throughout the year.

The service commitment of the Division has continued as in previous years. Approximately 10 per cent of our autopsy material is obtained from institutions in Toronto or the Province other than the General Hospital. The laboratory of muscle pathology under Dr. J. Humphrey has continued and the volume of work is growing

greatly.

Dr. M. I. Tom retired from the Division as of June 30, 1965, and her presence has been greatly missed. We are fortunate in that she is still available for consultation.

We were happy to welcome the following scientists to the Division during their visit to other centres in Toronto: Dr. J. N. Cummings, Professor of Chemical Pathology, Institute of Neurology, National Hospital, London; Dr. P. Gautier-Smith, National Hospital, London; and Dr. Dubowitz, Institute of Muscle Diseases, New York.

We are indeed fortunate in welcoming two new research associates, Dr. D. McGee, Toronto East General Hospital, who will be working on peripheral nerve ultrastructure and human diseases and Dr. H. J. Hoffman, Hospital for Sick Children, who will be continuing his studies on the effects of drugs on induced cerebral oedema. Three summer students are with us. Mr. N. Iscove will be completing his requirements for the B.Sc. (Med.) degree this summer. Miss S. Hughes and Miss S. Levinoff are assisting in various research projects in the Division.

RESEARCH

Dr. J. Humphrey and Dr. Rewcastle have studied hyperthyroid-induced changes in the skeletal muscles of cats and rabbits. A second project on cortisone-induced myopathy in rabbits is well under way.

Dr. J. Steele, a Playfair Fellow, continued and completed the pathological examination of the brains of cases collected by Dr. J. C. Richardson and described under the title of Progressive Supranuclear Palsy.

Dr. R. S. McPhedran has been engaged in a study of three cases of polymyositis

by light and electron miscroscopy.

Dr. R. Macdonald, a Research Fellow of the Muscular Dystrophy Association of Canada, has studied the ultrastructural changes in biopsies from patients with hypo- and hyperkalaemic periodic paralysis.

Dr. S. J. Peerless has assisted surgically in attempts to produce experimental

pseudohypertrophic degeneration of the inferior olive in cats.

Dr. O. Veidlinger assisted Dr. Rewcastle in studying the fine structure of subacute inclusion body encephalitis.

Dr. A. Hachache has studied the effects on the foetal nervous system of maternal exposure to carbon monoxide.

Dr. A. Joaquin has been interested in thin-walled cysts of the spinal canal.

Publications

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during Life" (Acta Haematologica, vol. 31, 1964, pp. 349-60).

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and One D/D Translocation Case" (American Journal of Diseases of Children, vol. 111, no. 3, March, 1966, pp. 236-47). Erkman, B., Basrur, V. R. and Conen, P. E. "D/D Translocation 'D' Syndrome" (Journal

of Pediatrics, vol. 67, no. 2, Aug., 1965, pp. 270-82).

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1894–1930).

JÉZÉQUEL, A.-M. and STEINER, J. W. "An Electron Microscopic Study of Tissue Culture Cells Infected with a Transmissible Agent Isolated from Hepatitis Patients" (Gastroenterology, vol. 48, no. 4, April, 1965, p. 504) (Abstract). "Nucleolar Caps—A Spontaneous Form of Cellular Degeneration?" (Federation

Proceedings, vol. 25, no. 2, part 1, March-April, 1966, p. 667) (Abstract).

"Progress in the Study of Transplantable Agents Isolated from Patients with Hepatitis" (Gastroenterology, vol. 50, no. 3, March, 1966, p. 411) (Abstract).

"Some Ultrastructural and Histochemical Aspects of Coxsackie Virus-Cell Interactions"

(Laboratory Investigation, vol. 15, no. 6, June, 1966, pp. 1055-83).

KATZ, A. (with Digby, J. W.). "Malignant Melanoma and Dermatomyositis" (Canadian Medical Association Journal, vol. 93, no. 26, Dec. 25, 1965, pp. 1367-9). LEWIN, P. K. and Moscarello, M. A. "Cardiac Myoglobin in Myoglobinuria" (Canadian

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tion of the Parenchyma by Biliary Hepatocytes" (Laboratory Investigation, vol. 15, no. 5, May, 1966, pp. 801–17).

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1965, p. 583) (Abstract).

PHILLIPS, M. J. and UNAKAR, N. J. "Glycogenosomes in Neonatal Rat Liver" (Federation

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REWCASTLE, N. B. and HUMPHREY, J. G. "Vacuolar Myopathy, Clinical, Histochemical and Microscopic Study" (Archives of Neurology, vol. 12, no. 6, June, 1965, pp. 570-82).

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PHARMACOLOGY

Under the direction of Professor E. A. Sellers

The number of lecture and laboratory courses offered by the Department has remained almost unchanged for several years. However, the content of various courses undergoes a continuous process of revision. Full courses were given to the second medical year, the third dental year and the fourth year of Pharmacy. Additional to these were a course in Toxicology (optional for fourth year Pharmacy, required for fourth year Food Chemistry), clinical pharmacological conferences to fourth year Medicine (with the Department of Therapeutics), an advanced seminar course for graduates and participation in courses offered by the Department of Physiology and the Departments of Ophthalmology and Anaesthesia in the Division of Postgraduate Medical Education. In fourth year Pharmacy, the laboratory classes are now given over the entire year and in these, as in all practical courses, attempts have been made to extend the "clinic" or tutorial system as much as possible. The size and number of class-laboratories limits further extension, especially for the medical group, which this year numbered 181 students.

The "expansion plan" approved by the Board of Governors last year had two objectives: first, the correction of deficiencies in space and in numbers of staff which now exist—to enable current commitments to be met; secondly, an expansion beyond present commitments. It is easy to confuse these objectives, for in resolution they become intermingled—physical facilities cannot be added piecemeal. We have made considerable progress in adding additional staff and, through the good offices of the administration, have completed plans for the occupancy next year of the fifth floor of the new Pharmacy Building, pending completion of the Medical Sciences Complex, which ultimately will house the Department.

Once more, we are indebted to the Laboratory of the Attorney General of the Province of Ontario, to the Defence Research Medical Laboratories and to the Alcohol and Drug Addiction Research Foundation, for the provision of facilities,

staff or both. The help of these organizations is greatly appreciated.

During the year, Professor W. Kalow returned from a leave-of-absence during which he had served as Director of Biological Studies, C. H. Boehringer Sohn, Ingelheim. However, Professor W. G. B. Casselman resigned his post to accept the position of Medical Director of Geigy (Canada) Ltd., which, interestingly enough, is asso-

ciated with Boehringer Sohn.

Drs. M. Ashwini Kumar, M. C. Sutter and Irvin Broder were appointed assistant professors early in the year, and have contributed to the Department both in teaching and in research. Dr. Broder also holds an appointment in the Department of Medicine at the Toronto Western Hospital. Dr. Ingeborg Radde was appointed associate and Drs. J. M. Khanna and R. A. Hickie were appointed lecturers. Dr. Radde also holds an appointment in the Department of Paediatrics at the Hospital for Sick Children. Dr. Paul D. Cooper also joined the Department as a research associate in July 1965.

In my report each year for the last six years, I have stressed the inadequacy of staff, budget and facilities in relation to work-load. Each year the discrepancy became more rather than less apparent and the staff appeared to be losing confidence

in the administration and in the future of the Faculty itself.

I should like to comment very favourably on the change in attitude which has already taken place. The Board of Governors and the Provincial Government have demonstrated in tangible form their appreciation of the serious plight of the Faculty and have done all in their power to contribute to its renaissance and expansion. Although we are still at the threshold of a large and exciting educational experiment, involving all the health sciences, it is apparent that the experiment is being supported strongly. With evidence of this support there is a renewed feeling of confidence and improvement in morale.

Graduate students have completed the following theses: for the M.Sc. degree, Miss E. J. Chung, "Drug Effects in Immunosympathectomized Rats"; D. Kadar, "Extraction and Isolation of Vasodepressor Substances from Rabbit Kidney Medulla"; Mrs. Irene Ockenden, "Studies on the Development of a New Assay for the Semi-

Synthetic Penicillins."

SCHOLARLY ADDRESSES

Professor W. Kalow, "Induction of Enzymes by Drugs," Symposium on Human Genetics, Louvain, Belgium; "Pharmacogenetics and the Predictability of Drug Responses," Ciba Symposium on "Predictable and Unpredictable Drug Responses in Man," London, England. Professor E. Llewellyn Thomas, Chairman's address during the Conference on the Basic Chemistry and Pharmacology of the Benzodiazepines, Toronto, October 1965; "The Pharmacology of the Major Tranquillizers," a meeting of the Physicians to the Homes for the Aged, Toronto. Professor G. E. Johnson, "Pharmacological Studies of the Biosynthesis and Release of Noradrenaline," Dalhousie University. Professor E. Schönbaum, "Nerve Growth Factor and its Antiserum," Department of Pharmacology, University of Ottawa, February 11, 1966; "Thyrotropin: Studies on a Bioassay," Department of Biology,

University of Ottawa, February 10, 1966; "Observations on a Sensitive Bioassay for Thyrotropin," Department of Medicine, University of Oregon Medical School, June 1, 1966; "Observations on a Sensitive Bioassay for Thyrotropin," Pacific Northwest Research Foundation, Seattle, June 3, 1966.

RESEARCH

Under the general direction of Professor Sellers and in collaboration with the Respiratory Unit of the Toronto General Hospital (Dr. Colin Woolf), Dr. T. H. Holmes has continued a long-term evaluation of respiratory stimulants, taken orally, in the treatment of chronic respiratory disease. Studies on bronchodilator agents (used in the treatment of asthma) and mucolytic compounds have also been undertaken. Dr. Wilma Basser has been involved in a study of anti-nauseant drugs conducted in collaboration with Drs. W. H. Johnson and Hugh Barber of the Department of Otolaryngology. An investigation on a time-release preparation of an anti-histaminic compound was carried out in the Department itself by Professors Kumar and Sutter, Drs. Holmes and Basser. Evaluation of new drugs under controlled conditions is important to the pharmaceutical industry and to the medical profession. In future years it is hoped that this will be one of the functions of a new division of the

Department—Clinical Pharmacology.

Under the direction of Dr. E. A. Sellers and Professor E. Schönbaum work has progressed well on two problems which have been continued for a number of years: (a) thyroid function and its control, and (b) acclimation to cold. In the field of thyroid endocrinology, a study of the serum levels of thyrotropin in apparently healthy medical students was carried out by Dr. A. Belzile in collaboration with other members of this Department. The results were described at a round-table discussion during the International Thyroid Conference in Rome, 1965. During the same discussion, and also at the 1966 meeting of the Federation of American Societies for Experimental Biology, Mrs. M-L. D. Schönbaum presented evidence that the thyrotropin bioassay, used successfully in this Department, does not seem to respond to an abnormal thyroid stimulator (LATS) found in the sera of patients with Graves' disease. This specificity of the bioassay response is most intriguing because it may permit us to study the nature of receptor sites for TSH and LATS. As the secretion of TSH is largely controlled by serum thyroxin (particularly the so-called "free" fraction), a study of free thyroxin in rats and man has been started. The rat and the human differ in respect to serum levels of thyroxin-binding proteins. There is considerable information about free thyroxin in human serum but little is known about this subject in the rat. Because the rat is used so commonly in experimental work, attempts are being made to remedy this lack of information. Miss Amy Britton, M.A., Department of Pathological Chemistry, is collaborating in this work. A promising series of studies is being carried out by Mrs. Schönbaum and several students, in which the effects of very small doses of thyrotropin on thyroid tissues in vitro are investigated.

In their studies of drug effects in rats acclimated to cold, Drs. Sellers and Schönbaum have concentrated their efforts primarily on β -adrenergic receptor-blocking drugs. Such drugs have recently attained prominence in the treatment of certain cardiovascular disorders. One of these drugs, propranolol, was observed to interfere with non-shivering thermogenesis, a form of heat production usually found

in rats living in the cold for prolonged periods of time.

In Professor H. Kalant's section, work has followed three main lines.

(1) The addiction research group has continued its investigation of the mechanisms of tolerance and tissue dependence in relation to the effects of alcohol and other neurotropic drugs. Work initiated by Dr. Y. Israel is being continued by various members of the Department and they have confirmed that ethanol inhibits the release of acetylcholine from brain tissue, by a mechanism which differs from that of barbiturates in that it is counteracted by potassium. They have shown that other alcohols

inhibit cation transport and ATPase activity in human and rat brain tissue, and that this effect is also potassium-sensitive. Other K⁺ were found not to compete with ethanol. Initial studies on chronically treated animals indicate that development of tolerance to alcohol involves an increase in ATPase activity.

Dr. J. M. Khanna and Mr. G. Bustos have extended their investigation of hepatic tolerance to alcohol. The increase in alcohol dehydrogenase activity in chronically treated animals has been found to occur in females as well as males and in gastric mucosa and other tissues as well as in liver. Significant drop in NAD/NADH ratio has been found in several tissues and the effect of this on intermediary metabolism of fats and other substances is being studied.

(2) Under joint direction with Dr. Peter Fleming of the Hospital for Sick Children, Mrs. Irene Ockenden has virtually completed the development of a highly sensitive and accurate assay for some newer semisynthetic penicillins based on inhibi-

tion of cephalosporinase activity.

(3) With Dr. R. A. Hickie further comparative studies of normal liver and Morris hepatoma 5123 have been carried out. Potassium transport was found to differ markedly in the two tissues and to be uninfluenced by external calcium concentration in the tumour. Also, the presence of the tumour at a remote site in the body was found to increase the sleeping time after injection of hexobarbital. Sialic acid content and composition in various sub-cellular fractions of normal liver and tumour are being studied chromatographically in efforts to explain some of the

observed differences in cell permeability.

The physical facilities in Professor F. A. Sunahara's section were completely renovated during the year and are now re-equipped for cardiovascular and smooth muscle investigation projects. The research programme is continuing in the extraction, purification and biological activities of renal medullary extracts that have a potent vasodepressor activity. Five vasodepressor substances having chemical, physical and pharmacological properties very similar to those of the prostoglandin family have been isolated from the rabbit renal medulla. These are interesting and pertinent findings in view of the argument that renal medulla may play a part in the etiology and maintenance of renal hypertension. Experimental renal hypertension (by Grollman technique) has been successfully produced in rats with and without renal medullary autotransplant. The presence of the viable medullary tissue did not protect the rat from developing high blood pressure. Work is proceeding to quantitate the amount of vasodepressor material in the kidneys of normal and hypertensive animals.

In Professor G. E. Johnson's section, work has continued on the mechanisms of action of drugs on the autonomic nervous system. Studies have included the storage of the compound metaraminol within sympathetic nerves and its release following sympathetic stimulation. Research into the interrelationships between thyroid activity and catecholamine release was begun. As animals living in a cold environment were rendered hypothyroid, increase in noradrenaline and adrenaline secretion occurred. No such change occurred if rats were studied in a warm room. Animals living in a cold ambient temperature require an adequate secretion of adrenaline and/or noradrenaline for thermogenesis and a decrease in thyroid activity diminishes the calorigenic action of these hormones. It is thus believed that the increased secretion of catecholamines seen in the hypothyroid cold-stressed rats results from a compensatory mechanism to maintain normothermia. Results of these and other works were presented at the meetings of the Canadian Federation of Biological Societies in Ottawa, June 1965, and the International Union of Physiological Societies in Tokyo, September 1965. Dr. K. Veronica Flattery joined Dr. Johnson's group in August 1965.

Professor M. C. Sutter is interested in cardiovascular pharmacology, particularly in the pharmacology of veins. He has been studying the physiology and pharmacology of veins in vivo with particular reference to the anterior mesenteric-portal system in small mammals. Isolated longitudinal strips from this vein show spontaneous electrical and mechanical activity. Investigations have been carried out to ascertain whether such-spontaneous activity occurs in situ and whether pressure changes

accompany it. In vitro isolated strips of vein and other smooth muscle are being used as systems in which to study the detailed mechanisms whereby drugs contract smooth muscle. The main purpose is to elucidate the steps necessary between membranedrug interaction and actual contraction of smooth muscle. This work has been supported by a grant from the Ontario Heart Foundation.

Professor M. Ashwini Kumar has pursued researches on calcium homeostasis and thyrocalcitonin as well as histidine decarboxylase activity. This work is supported

by the MRC and the J. P. Bickell Foundation.

Dr. Paul D. Cooper has collaborated with Dr. F. A. Sunahara on the isolation and purification of vasodepressor materials from the kidney medulla, and with Dr. A. Conn (Hospital for Sick Children) on methods for the administration of pressor agents by inhalation. Dr. Cooper co-operated with various members of this Department in carrying out synthetic and analytical chemical work. At present, he is working on a novel assay method for psychotropic drugs using a photo-actuated activitycounter for insects. Model compounds will be synthesized with the object of studying the structure-function relationships of psychotomimetic drugs. This work is being supported by a grant from the Playfair Foundation.

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PHYSIOLOGY

Under the direction of Professor R. E. Haist

During the past year, much thought has been given to changes in curriculum and in the physical facilities for teaching, as well as to possible new research activities. The acquisition of new staff has presented difficulties because of the restriction of space. However, during the past year, three new members of professorial rank were added to the Department, two of whom have cross-appointments with clinical departments. It is hoped that this type of arrangement with clinical departments can be developed further. The addition to the staff of a medically qualified graduate in

Engineering Science has strengthened the biophysical aspects of our work.

This year, the class laboratory work has been greatly revised and improved. Physiographs were provided for the students for the first time and a start was made toward modernizing the remainder of the class equipment. As a result, the laboratory work was carried out more effectively and the student interest was maintained at a higher level. More equipment of this type is needed in order that the number of students per unit of equipment may be reduced to the proper level. The use of closed circuit television is still being tested in an attempt to find its best application in our teaching. Special project work in the second medical year was again undertaken and, although this is very time-consuming for the staff, the student response has been good. It is felt to be worth the extra effort. Over 1,000 students received instruction in the various courses given by the Department. There were 14 graduate students and 4 postdoctoral fellows in the department. Three candidates completed their work for the Ph.D. degree.

Many distinguished scientists visited the Department, the following presenting lectures or seminars (six of these lectures, those marked with an asterisk, were under the Visiting Lecturers Programme of the School of Graduate Studies); Dr. Y. Takaoka, Nagasaki University, Japan; Dr. J. P. Hoet, University of Louvain, Belgium; Dr. P. R. Bouman, University of Groningen, Netherlands; Dr. G. F. Cahill, Harvard University Medical School, Boston; Dr. V. B. Brooks, New York Medical College; Dr. Donald A. McDonald, Presbyterian Hospital, Philadelphia; Dr. S. P. Bessman, University of Maryland; Dr. Margaret Beznak, University of Ottawa; Dr. I. G. Jarrett, C.S.I.R.O., Adelaide, S. Australia; Dr. J. P. Cordeau, University of

Montreal; Dr. Ivan Bihler,* University of Manitoba.

In addition special lectures in our programme were given by Dr. M. A. Ashworth, Dr. N. Forbath, Dr. G. Hetenyi, Dr. D. R. Hopkins, Dr. A. A. Horner, Dr. R. Ninomiya, Dr. A. M. Rappaport, Dr. A. Sirek and Dr. O. Sirek.

With the help of the School of Graduate Studies the first meeting of all the chairmen of Departments of Physiology in the Province of Ontario was arranged in

order to discuss problems relating to graduate work in Physiology.

The Department is indebted to several honorary members who have assisted with undergraduate or graduate teaching: Dr. Stanley Hartroft, Dr. Donald Fraser and Dr. Julio Martin of the Research Institute of the Hospital for Sick Children; Dr. Walter Johnson of the Department of Otolaryngology; and Dr. K. Money of the Defence Research Medical Laboratories. Dr. J. Archibald, Honorary Consultant Veterinarian, has given valuable help in relation to the animal care.

The research within the Department has been active. Most of this was supported

by grants from outside agencies. It would be desirable to have a basic level of research support from University sources for each member of the professorial staff. In addition, the support from government agencies should be increased.

SCHOLARLY ADDRESSES

Professor J. Campbell, "Evidence of Maintained Increase in Insulin Secretion Induced by Growth Hormone, with Further Augmentation after Meals or Infusion of Glucose, in Dogs with Portal Vein Cannulae," American Diabetes Association, New York; "Effects of Cortisone and Growth Hormone and Serum Insulin in Chinese Hamsters"; "Effects of Growth Hormone on Serum Insulin and Insulin Secretion in Dogs," Toronto Diabetes Association. Professor W. S. HARTROFT, "The Effects of Therapeutic Liquid Diets with and without Alcohol on Cirrhotic Rats," American Society for Clinical Nutrition, Atlantic City; "Enzymatic and Ultrastructural Changes in Liver of Vitamin E-selenium Deficient Rats," Canadian Federation of Biological Societies, Ottawa; "Experimental Interceroid Embolism," American Association of Pathologists and Bacteriologists, Philadelphia; "The Insoluble Nature of Experimental Pulmonary Fat Emboli," Canadian Federation of Biological Societies, Ottawa; "Is Saturated Fat more Atherogenic than Polyunsaturated Fat at Similar Elevations of Serum Cholesterol?" American Society for Clinical Nutrition, Atlantic City; "The Nutritional Aspects of Hypertension and its Reversibility," American Public Health Association, Chicago; "Role of Carbohydrate in the Pathogenesis of Alcohol Induced Hepatosis," American Association for the Study of Liver Diseases.

Professor G. J. Hetenyi, "Mechanisms in the Homeostasis of Glucose," Tokyo Diabetes Society, Tokyo; "Hepatic Response to Infused Glucose in Unanaesthetized Dogs," Roswell Park Memorial Institute, Buffalo; "Glucose Homeostasis: A Study with Tracer Methods," University of Ottawa; 4 lectures on "Isotopes as Tracers," Division of Postgraduate Medical Education, University of Toronto. Professor A. M. Rappader, "Ciné-veinographie hépatique et rénale," Journées Internationales d'Hépatologie, Lyon, France; "Autogreffe souscutanée pediculée d'un residu isolé pancréatique, effets du blocage temporaire de la sécrétion," postgraduate course in Gastroenterology, Hôpital St. Antoine, Paris; "Microcirculation hépatique normale et pathologique," Societé Nationale Française de Gastroenterologie, Hôpital Hôtel-Dieu, Paris, France; "Functional and Circulatory Aspects of Hepatic Structure," "Autogreffe pancréatique, effets du blocage temporaire de sa sécrétion interne," Faculté de Médicine, Université Laval, Québec; and "Normal and Pathologic Microcirculation of the Living Mammalian Liver," symposium on the Human Capillary. Circulation, Kingston, Jamaica.

Professor J. W. Scott, "Assessment of Hearing in the Newborn," Canadian Speech and Hearing Congress, Toronto; "Physical Techniques in the Diagnosis of Intracranial Disease," Engineering Institute of Canada, Arvida Branch. Professor A. Sirek, "Immunoelectrophoretic Studies of Serum Proteins in Newborn Infants of Diabetic Mothers," International Congress of Physiological Sciences, Tokyo; "The Blood Chemistry in Newborn Infants of Diabetic Mothers," Tokyo Diabetes Association and the Diabetes Research Councils of Osaka and Nagoya; "Immunoelectrophoretic Studies of Hemopexin," at a symposium on Diabetes in Frankfurt/Main; "Plasma Glycoproteins in Infants of Diabetic Mothers," the Universities of Frankfurt/

Main, Florence and Rome.

Professor O. V. Sirek, "The Nature of the Hyperglycemic Substance Released by Growth Hormone," International Congress of Physiological Sciences, Tokyo; "Current Concepts of Insulin Transport in Blood," Tokyo Diabetes Association and the Diabetes Research Councils of Osaka and Nagoya; "Serum Proteins in Newborn Infants of Diabetic Mothers," National Diabetes Congress of Italy, Catania; "Changes in Plasma Glucose and Free Fatty Acid Levels Following Growth Hormone Administration," at a symposium on Diabetes, Frankfurt/Main; "Metabolic Studies in Houssay Animals," the Universities of Frankfurt/Main, Florence and Rome; "Alterations

in the Serum Protein Patterns of Newborn Infants of Diabetic Mothers," the Sinai Hospital of Detroit; "Metabolic Studies in Houssay Dogs," Department of Physiology, Wayne State University.

RESEARCH

In Professor R. E. Haist's section, Professor John K. Davidson with the assistance of Miss M. Zeigler and Mr. Van Nooten studied the mouse hemidiaphragm insulin assay in order to determine its statistical characteristics and limitations as a method for determining insulin activity in native and treated serum. The influence of various factors which might conceivably affect the assay was studied. With Professor M. A. Ashworth, Dr. B. Lin and other colleagues, changes in insulin activity after glucose, tolbutamide, pancreatectomy and pancreatic transplants were investigated. Studies in normal and diabetic humans were also undertaken. Dr. Boniface J. Lin in collaboration with Dr. C. C. Yip has investigated the state of insulin in the pancreas and, in co-operation with Dr. Davidson, has studied the effect of protein on the protection of insulin from degradation during incubation with mouse diaphragms and on the adsorption of insulin on glass. Insulin studies using the Berson-Yalow procedure were carried out in experiments in which the bioassay was also used, in order to provide a comparison of results obtained by the two methods under a variety of conditions. Analysis of standard curves from the immunochemical assay led Dr. R. Ninomiya with Dr. Lin to develop a computer programme to facilitate the calculation of the potency of insulin. The programme was found to be applicable to the assay of other hormones by the Berson-Yalow type of immunoassay. Miss J. Quinlan with Dr. M. A. Ashworth has studied the effect of some procedures on the insulin levels in thoracic duct lymph.

In Professor J. Campbell's section, hormonal influences on insulin secretion have been studied. With Dr. Krishna Sudha Rastogi and Mrs. V. Lazdins, the effects of pituitary growth hormone and adrenal corticoids on insulin and other constituents of serum in mice and dogs were studied and the relation of the adrenal glands to the responses of the pancreatic islets in dogs was investigated. With Dr. Y. Tasaka, the release of insulin from the pancreas in vitro under various conditions has been followed. Relations between free fatty acids and their protein vehicles in serum and liver ischemia in diabetes have been examined with Mr. G. R. Green and in co-

operation with Professor A. M. Rappaport and Professor M. Vranic.

In Professor G. J. Hetenyi's section, the work on the regulation of hepatic glucose production has been continued in collaboration with Professor G. A. Wrenshall. It has been shown that an intravenous infusion of glucose reduces the rate of glucose production in normal as well as in diabetic dogs, although to a lesser extent in the latter. The infusion of galactose did not alter glucose production although this sugar is utilized by the liver. The selective increase of glucose level in the cerebral circulation did not prove to be more effective than a comparable in vitro infusion. Drs. N. Forbath, Hetenyi and A. B. Kenshole studied the lactate turnover in normal and diabetic dogs. Drs. Hetenyi, R. Ninomiya and Wrenshall concluded their study of the usefulness of different tracers and tracer methods in calculating parameters of glucose turnover. Drs. Forbath and Kenshole continued their study on the glucose metabolism of patients treated with adrenal steroids. In collaboration with Professors J. W. Steiner, M. J. Phillips and Dr. Y. J. J. LeBeux (Department of Pathology), a study to correlate the ultrastructure of the liver with hepatic glucose transfer and concentration is in progress. The influence of octanoic acid on glucose metabolism has been studied with Professor J. R. Evans and Dr. S. S. Sanbar.

Professor F. C. Monkhouse, with Mrs. Susan Milojevic, has continued to study the function of plasma antithrombin. Some improvement in biochemical purity has been obtained. In addition a study of inhibition of antithrombin has been carried out. It has been shown that gum acacia (used in a number of *in vitro* clotting tests) and phenols (used as a preservative in some drugs) are inhibitors of antithrombin. With the assistance of Miss Stephanie Christie and Mr. I. Smith, and in collaboration with Dr. E. C. Abbott and Dr. J. C. Laidlaw, studies have been carried out on

the action of two synthetic sulphated polysaccharides in rats. It was found that daily injections of these drugs greatly reduced the thickness of the zona glomerulosa of the adrenal glands and decreased aldosterone production. These drugs were efficient in releasing clearing factor lipase and lowering the triglyceride and total cholesterol levels in blood. In collaboration with Mr. C. R. Cowan, a study of the development of electrically induced thrombi in the mesenteric vessels of the mouse was made. Platelet clumping and thrombus formation took place at the positive electrode and vasoconstriction at the negative electrode. These effects could also be obtained by lowering and raising the pH respectively of the fluid surrounding the vessels. Dr. Alan Horner with the assistance of Mrs. Donna Coles has continued studies on the metabolism of mucopolysaccharides. He has developed an electrophoretic technique for separating mucopolysaccharide which had previously moved as a single band and had been considered a single entity. Dr. Hopkins has investigated the natural plasmin (fibrinolysin) inhibitors in dog plasma and has studied the changes in plasmin activity during normal coagulation.

Professor L. Organ is undertaking experiments involving the measurement of intracellular potentials of cardiac muscle fibres. In conjunction with the Department of Neurosurgery, he is testing an impedance probe and determining the electrical

impedance of cerebral tissue in patients.

In Professor A. M. Rappaport's section, research is continuing on the effect of drugs and metabolites on the portal and hepatic arterial circulation as well as on cardiac output. These investigations are done in co-operation with Professor N. F. Moody and Dr. Llewellyn Thomas from the Department of Biomedical Electronics. The study of the fate of autogenous pancreatic transplants in the dog was carried out together with Dr. R. I. Mitchell of the Department of Surgery and Dr. J. K. Davidson. With Drs. M. Vranic, G. A. Wrenshall, J. Campbell, Mr. G. R. Green and Mr. J. S. Cowan, the effects of hepatic arterial ischemia on survival and metabolism of partially and totally depancreatized dogs were investigated. The results consisted in depressed ketone body formation and in a prolonged survival of the animals even though they did not receive insulin.

Professor M. Henderson Santalo continued her investigation of the relation between insulin and the liver. The increase in glucose space in rat liver after insulin could be prevented by infusion of the rats with sufficient glucose to prevent hypoglycemia, which suggested that the increase might be due to the hypoglycemia rather than to the insulin. Mrs. Sirje Sellers completed her study of the effect of hypoglycemia produced by phlorizin on the glucose space of liver and found that hypoglycemia produced in this way did not increase the glucose space. The experiments on both phlorizin and insulin are now being extended to obtain more information

concerning their action on the liver.

In Professor J. W. Scott's section, Mr. K. Marshall has continued the study of mammalian semi-circular canals with the assistance of Dr. J. K. Lim. Dr. J. A. Love has commenced a study of cortical-evoked responses. Dr. J. K. Lim is also assisting

Dr. R. R. Tasker in the study of dyskinesias.

Professor O. V. Sirek with the collaboration of Professor Anna Sirek has carried out immunological studies which reveal that newborn infants of diabetic mothers have hemopexin in their serum while only negligible amounts of this protein are present in newborn infants of normal mothers. Metabolic studies in endocrinologically deficient dogs showed that it was possible in some instances to maintain depancreatized-hypophysectomized (Houssay) dogs without substitution therapy for eight months. The behaviour of numerous blood constituents such as plasma protein, free fatty acids, glucose and α -amino nitrogen were studied as well as the composition of acid mucopolysaccharides of their skin and blood vessels.

Professor M. Vranic with the assistance of Miss Hanright has been comparing the effects of intraportal infusion of insulin with similar infusions into a peripheral vein in partially departered dogs immediately following removal of a pedunculated subcutaneous pancreatic transplant. Rates of glucose production and utilization were determined by tracer methods. This work is being done in collaboration

with Professor G. A. Wrenshall, as is also research on the absorption rates of glucose and the effects of exercise on the rates of glucose production. With Professors A. M. Rappaport, Wrenshall and J. Campbell and Mr. J. S. Cowan the effects of liver ischemia have been investigated in depancreatized dogs.

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PSYCHIATRY

Under the direction of Professor A. B. Stokes

The Clarke Institute of Psychiatry was officially opened May 18, 1966, and the University Department of Psychiatry was welcomed into the Institute by academic ceremonies on June 13, 14 and 15, 1966. These arrangements and the high occasions which symbolized them represent a tremendous leap forward for psychiatry in Toronto, Ontario and Canada. Unique facilities have been provided for the practical, theoretical and academic development of studies in the fields of mental illness and emotional disorders. The providing of exemplary services for the purposes of education and research has become an actuality with the attendant opportunities and

Thanks are due to many friends of psychiatry who have exercised their interest and influence to bring the Clarke Institute of Psychiatry into being: first, the Government of Ontario, and particularly the Premier and the Minister of Health and his staff in the Mental Health Division; secondly, the Board of Governors, the President and the administrative officers of the University of Toronto; thirdly, the Ontario Mental Health Foundation, under the chairmanship of Mr. Justice Arthur Kelly and the Board of Trustees of the Institute of Psychiatry, under the chairmanship of Mr. Ian Davidson; fourthly, over the years and embracing the eras of Dr. C. K. Clarke and Dr. C. B. Farrar, a cohort of colleagues and friends without whose anonymous encouragement effort would not have been sustained; and lastly, particularly in the formative and initial stages of a great enterprise, the efforts of Dean J. A. Mac-Farlane and Dean J. D. Hamilton, with the endorsement of the Council of the Faculty of Medicine.

At the official opening, under the chairmanship of Mr. Ian Davidson, the Honourable John P. Robarts, Prime Minister of Ontario, delivered a rousing and encouraging address to a full house with overflow attendances covered by closed circuit television. The Honourable T. Ray Connell, Minister of Public Works, presented the golden key to the Honourable Matthew B. Dymond, who passed it to Dr. Charles A. Roberts, Executive Director of the Clarke Institute of Psychiatry. In wellchosen phrases the two Ministers and Dr. Roberts gave expression to the hopes and aspirations of the Institute and to an earnest and irrevocable intent to fashion an

oustanding centre of services, education and research in psychiatry.

The intent was emphasized and symbolized at the academic ceremonies. Distinguished speakers from Canada and abroad contributed their thinking on the future of psychiatry and the ferment of endeavour in the field of mental disorder. Over a three-day period, academic lectures were delivered under the auspices of the School of Graduate Studies, the Postgraduate Division of the Medical Faculty and the Clarke Institute of Psychiatry.

The lectures were delivered by: Dr. Henry W. Brosin, Director and Chairman, Department of Psychiatry, University of Pittsburgh, President-Elect of the American Psychiatric Association, on "The Changing Curriculum." Dr. Walter E. Barton, Medical Director of the American Psychiatric Association, on "Historical Perspectives in the Delivery of Psychiatric Services." Dr. E. M. Gruenberg, Professor of Psychiatry, Psychiatric Epidemiology Research Unit, Columbia University, New York, on "Can the Social Reorganization of Psychiatric Care Prevent some Cases of Social Breakdown?" Dr. H. H. Jasper, Research Professor (Neurological Science), Department of Physiology, University of Montreal, on "Neurophysiological Mechanisms of Perceptual Experience and States of Consciousness" (read by Dr. B. Doane of Dalhousie University). Sir Aubrey Lewis, Professor and Head of the Institute of Psychiatry, the Maudsley Hospital, London, England, on "Continuity in Psychiatric Education and Training." Dr. H. P. Rome, Senior Consultant, Section of Psychiatry, the Mayo Clinic, Rochester, Minnesota, on "Computers and Medicine." Dr. C. Laurin, Chief Psychiatrist, Institut Albert-Prevost, Clinique Neuro-Psychiatrique, Montreal, on "Teaching Models and Methods for Psychiatry." And Dr. J. S. Tyhurst, Professor and Head, Department of Psychiatry, University of British Columbia, Vancouver, on "Prevention 1966."

Further, Dr. Iago Galdston, Chief of Psychiatric Training in the State of Connecticut, delivered a sincere and thought-provoking after-dinner address on "Civilisation and its Discontents," and Lady Hilda Lewis, Honorary Director of the Child Psychiatric Clinic, St. George's Hospital, London, England, conducted a stimulating

seminar on "Adoption Practices."

The welcoming of guests, the formal opening ceremonies with academic regalia, the President's dinner, the Department of Psychiatry dinner, and the conferring of the degree of Doctors of Laws (honoris causa) on Sir Aubrey Lewis at Medical Convocation, woven together, made up a texture of unforgettable memories for which the Department of Psychiatry, its colleagues and friends, are thankfully indebted.

While the Clarke Institute has been emergent in splendid birth, the Toronto Psychiatric Hospital has been gracefully accepting a more submergent role. The Hospital, at its inception in 1925, gave general representation to the ideas of C. K. Clarke; now it will reflect a particular Clarke interest in the study of problems of mental retardation. The removal of the University Department of Psychiatry from the Hospital to the Institute will be attended by mixed feelings, assuaged in part by

a continuing educational relationship.

The network organization of graduate education in Psychiatry has been pioneered by the University of Toronto Department of Psychiatry, from the Toronto Psychiatric Hospital. In effect the network arrangement emphasizes the variety of ways in which psychiatric problems may emerge in the human scene and the differing techniques which are available as therapeutic resources. The different manifestations of illness and the various techniques, nevertheless, are to be regarded as embraced by a more or less unitary body of knowledge called psychiatry. The educational problem is to present a balanced holistic theme while allowing concentrated study of the various parts; too often the part may be taken for the whole or the whole for the part with the attendant dangers of fragmentation or generalization.

It might be justly said that this educational problem is not peculiar to psychiatry. But while admitting the similar issue to other branches of knowledge (e.g. mathematics or physics) the matter is more cogent where the complexities of human behaviour are under consideration. A graduate physician, studying to become a psychiatrist, must in the space of four years invest his time in thinking about problems that range from the gene to social adaptation, from the biological to the behavioural; at the same time he must apply his thinking over a span of committed responsibility from genetic counselling to the treatment of breakdown in social adaptation, from organ pathology to personal and public calamities. It is to provide a nexus of appropriate

experience that the network organization has been developed.

In the past year a score of clinical settings has provided educational opportunities for 70 graduate students in Psychiatry; 79 teachers have been involved in these graduate studies, organized in relation to both in-service instruction and central courses of lectures and seminars, spread throughout the academic year.

The administration of classes, the provision of teaching resource and the appraisal of the educational processes represent a considerable responsibility for the newly appointed Director of Education, Dr. W. J. Stauble. His efforts over the past year have been ably supported by the Graduate Committee and have allowed the shaping of a newly authorized Diploma course based on three years of graduate study.

Twenty graduate students were successful in the current Diploma examinations; of past diplomates 20 were successful in the Certification examinations of the Royal

College of Physicians and Surgeons of Canada—one was awarded Fellowship.

The problems of curriculum, as they relate to the place of psychiatry in the undergraduate medical years, have been continuously explored by a strong Committee

on Undergraduate Education, with Dr. W. E. Boothroyd as Chairman.

Currently the two outstanding issues are the inclusion of psychological and social studies in the basic sciences years and the dividing of large classes in the clinical years into small groups of three to five students. Progress in these two areas has been reflected in a better standard of psychiatric competence in the final year examinations.

The courses of instruction offered to other health sciences by the Department of Psychiatry continue in liveliness despite the strain on teacher resource—some thousands of aggregate hours are quantitative indices of an endeavour that reaches out

for quality.

Over the past year the Department of Psychiatry in association with the Ontario Association for the Mentally Retarded has been honoured by the presence of Dr. H. C. Haywood as visiting professor. Professor Haywood, a clinical psychologist from Peabody College, Tennessee, has been a most stimulating colleague whose influence

will long be felt.

Other distinguished visitors have accepted the invitation of Dr. A. L. Jones and his committee to conduct seminars and deliver lectures in Toronto. Dr. P. H. Connell of London, England, Dr. A. M. Marcus of Vancouver, Dr. N. D. Tabachnick of Los Angeles, Dr. N. B. Epstein of Montreal, Dr. B. Townsend of Essex, England, Dr. J. Klauber of London, England, Dr. P. V. Lemkau of Baltimore, Dr. F. P. Fish of Liverpool, England and Dr. S. Wolf of Oklahoma made up a company who have honoured the Department by their active engagement in the educational programmes.

Congratulations are due to Dr. G. P. Brawley for winning the Minister of Health's Gold Medal, to Dr. C. G. Chamberlain for a McLaughlin Fellowship award and to Dr. D. J. Macdonald for gaining an Ontario Mental Health Foundation

Travelling Fellowship.

The indebtedness of the Department to many friends, donors and supporters cannot be sufficiently expressed. They have contributed to the exciting developments of a pregnant year which will be recorded as notable and perhaps even historic.

RESEARCH

Reported by Professor J. W. Lovett Doust

The academic opening in June 1966 of the long-awaited Clarke Institute of Psychiatry provided both an excellent series of clinical and laboratory facilities and also an inspiration, even a sense of destiny, for the as yet small group of research workers who have commenced or transferred their investigations there. With its representation of behavioural sciences basic to psychiatry on one of its two research floors and basic biological sciences on the other, the north wing of the Clarke Institute is equipped to provide exemplary facilities in specialties seemingly as far apart as epidemiology and neurophysiology, as diverse as social engineering and psychopharmacology and as hierarchically removed as social pathology and neuropathology. In the clinical field, it is to be hoped that the spirit of investigation will haunt every bed and out-patient clinic of the tower building. It will be especially present on the seventh, or clinical investigation floor. Here, the headquarters of the Professorial Unit, will be located areas specially equipped and staffed to undertake clinical

research inquiries in depth. Psychosomatic relationships, metabolism and clinical physiology will be the three principal orientations initially represented on this research ward.

It is appropriate to commence this account of the research undertakings of the Department with that work which, if not initiated at the Clarke, at least involved the Clarke Institute facilities and is now actively prosecuted there. As an introduction to this, the departmental archivist, Mr. C. Greenland, has made considerable progress in assembling the C. K. Clarke archives now established at the Clarke Institute of Psychiatry. The available material has already resulted in the publication of a brief biography of Dr. C. K. Clarke, formerly Dean of the Faculty of Medicine, and first Professor of Psychiatry in the University of Toronto. The Clarke archives provide a substantial volume of manuscripts, material and documents essential for scholarly research into the early history of psychiatry in Canada. Psycho-biographical research has also been completed on the forensic issues involved in the trial of Louis Riel and the mystical experience of Dr. R. M. Bucke. Both of these studies have now been

published.

On the clinical investigation unit, Dr. H. C. Stancer with Dr. G. Brown and Dr. B. Quarrington have completed the three projects on in vivo glucose tolerance measurement. The modified methodology for the use of the autoanalyzer in vivo has been established, a mathematical method for the analysis of the complex curves obtained from normals has been devised and a comparison of the glucose tolerance of normals and schizophrenics has been compared under strict dietary conditions. Contrary to what has been reported in the literature, no difference was found for schizophrenics under these controlled conditions. A report of this work was presented at the Canadian Society for Clinical Investigation and the separate projects have been submitted for publication. Dr. Stancer with Dr. Lyall and Dr. Quarrington are attempting to develop a method whereby the autoanalyzer could be used to measure blood cholesterol in vivo to determine whether this substance does, in fact, rise during emotional stress. As part of their needs for evaluating patients longitudinally they have devised a new check list for the daily psychological evaluation of patients. Dr. Stancer with Drs. Quarrington, Brown, Lyall, Bonkalo and Cookson have carried out a carefully controlled longitudinal investigation of periodic manic-depressive illness using medication to raise or lower brain serotonin and noradrenalin. The assessment of psychological, physiological and biochemical parameters indicated that the patient's psychiatric state could be markedly affected in a manner which suggested the importance of both serotonin and noradrenalin in the effective states. This work was presented at the annual meeting of the American Psychiatric Association and is being submitted for publication.

In the neurochemical laboratories, Dr. Stancer with Dr. Sastry have measured the blood lipids in schizophrenia and the cerebrospinal fluid lipids in mental retardation. A substance heretofore not reported has been found in the cerebrospinal fluid and blood of two patients with Tay Sachs disease which may be related to the stage of the disease. Attempts are being made to identify the minute amounts of this substance which are isolated by thin layer chromatography. With the help of the Hospital for Sick Children and the Toronto General Hospital an attempt is being made to establish "normal" values of CSF phospholipids obtained from patients without known neurological illness. With the recent interest in the pineal gland and its possible importance in the etiology of psychiatric disorders the lipids of human and bovine pineal glands are being evaluated by Drs. Stancer and Sastry. Human pineals are obtained soon after death in various age groups through the courtesy of

Dr. Morton Shulman.

In the Section of Psychophysiology, Dr. J. W. Lovett Doust and his staff have continued their search for identifying data in their studies of the physiology of behaviour. An inquiry into the nosological significance of spontaneous autonomic rhythmic activity in personality disorders of varying psychiatric significance is being completed; another investigation, this time with Mr. I. Podnieks and into recurrent

cycles of vigilance as determined by the Baker-Mackworth clock, is in the stage of data analysis and will be completed shortly. Meantime, some new measurement tools are being tested and among these a Sperry echoencephalograph and a pair of homebuilt bandpass filters for pre-determined EEG wave frequency analysis promise to be interesting.

In the Section of Psychology, Dr. Bruce Quarrington has been studying a number of behaviour checklists and rating scales in an attempt optimally to monitor behavioural change. In collaboration with the Speech Clinic he has been engaged on various problems of stuttering, particularly in regard to its onset in young children. Also, in collaboration with clinical psychologists from several different hospitals, Dr. Quarrington has been participating in the development of a computer scored

and interpreted psychologist test system.

In the field of social psychiatry, Dr. D. Coates has carried out two investigations over the past year. In the first, "Family Interaction in Schizophrenia," he has demonstrated that expressed emotion of the closest relative does not predict or correlate with one year clinical course or rehospitalization. The second, "Mood Interaction in Marriage," is a study of two self-observed kinetic variables in relation to marital satisfaction, self-esteem, neuroticism, etc. A preliminary study was also conducted on the contingent factors in the process of self-definition as patient. Further discussion has confirmed the lack of feasibility of establishing a Toronto psychiatric register.

In the more purely clinical area, Dr. P. Melville has continued to experiment with the scope and limitations of milieu therapy. Small group treatment has been added and an extension of the element of ward self-government has been of considerable interest. A directly related experiment was conducted by Dr. June Clarke and Mr. A. Grant into the role conceptions of patients which figure so prominently in this sort of management. They gave questionnaires to newly admitted patients which assessed their concepts of themselves as patients and their views of the nature of hospital treatment and compared changes in these views as affected by a special series of orientation meetings. There were no distinct differences between their subjects and a control group, suggesting that the principles of the management of

this special ward are grasped adequately without a special introduction.

Along with other services transferring from Toronto Psychiatric Hospital to the Clarke Institute is the Forensic Service. The past year has been one of special research concentration on homosexuality. Following the publication of the Handbook on Pedophilia during the last academic year, studies on sexual offences and sexual deviation have been expanded further. Empirical substudies dealt with rape and attempted rape and indecent assault on a female. Legal substudies were completed by Dr. K. Gray and Mr. A. Gigeroff in the area of development of jurisprudential concepts, and approaches from the seventeenth century on and their reflection in legislative changes. Extensive bibliographical searches have been made by Miss M. Wildridge and Dr. J. Mohr to prepare comparative data to the studies. Collection of data and further analysis were carried on in the studies of sexual behaviour and parent-child relations of sexual deviants by Dr. D. Paitich. Studies by Mr. V. Hartman in the application of group therapy to problems in sexual deviation came to fruition. With the Ontario Hospital, Penetang, studies in homicide were continued by Drs. McKnight and Mohr especially in the area of matricide. Further data collection was also undertaken in the study of female homosexuals with the Elizabeth Fry Society. Special attention has again been given to the problem of the dangerous offender and a case register has been established.

In the general area of mental retardation, the unit established at Toronto Psychiatric Hospital under the leadership of Dr. J. B. Fotheringham was enriched by the presence during the past academic year of a distinguished visiting professor, Dr. C. Haywood of the Department of Psychology, George Peabody College. Dr. Haywood's energy and research resource extended to inquiries from many hundreds of children in the Toronto schools area and the Ontario Hospital School, Orillia.

The investigations ranged from a study of personality orientation in over-achieving and under-achieving children at three levels of intelligence, through some uses of a new picture vocabulary test for psychometric screening and for prediction of achievement, to a study of the effects of institutionalization on the personality of mental retardates. Dr. Fotheringham himself has launched a project which seeks to study the changes in the level of functioning of mentally retarded children and their families. Two groups are being investigated: one in which the child is admitted after assessment to an institution, and the other, a control group, wherein the child remains within the community.

Also in relation to child psychiatry is the work proceeding at Thistletown Hospital under Dr. H. Alderton. Work on the control of enuresis by the anti-depressant drug imipramine continues in an effort to define those conditions subserving maximal effect. Also, with Dr. B. Hoddinott, a Children's Pathology Index is being studied in an attempt to quantify behaviour and, with Dr. T. Ward, some

pilot experiments are underway in the treatment of infantile autism.

At Toronto Psychiatric Hospital, Dr. D. Cappon is bringing to a conclusion six years of investigation of orientational perception. His results indicate no differences between patients and controls with the techniques of measurement employed.

Working as well with the Department of Medicine, Dr. R. Pos has embarked upon an ambitious and widely based project into the psychiatric consequences of sensory deprivation. This first year has been largely one of development of experimental techniques but it has also included the involvement of an interdisciplinary team of workers and the promise of exciting progress in a potentially rewarding field.

Finally, the Research Unit at Ontario Hospital, Toronto, continues to represent a focussing of scientific endeavour in the area of biological psychiatry. On the research ward and in its associated neuroendrocrinological laboratories, an enduring interest in the relationship between a number of different orders of biological rhythms and recurrent mental illness has been fostered. Drs. B. Cookson and Lovett Doust are continuing to find significant relationships between diurnal rhythms and potassium excretion and mood. Evidence is also accumulating of a relationship between the reproductive rhythm and recurrent mental illness. The unit now has three examples of individuals (two women and one man) with 9-13 day 17-ketosteroid excretion rhythms which are subharmonics of the behavioural cycles of their periodic catatonia. The 17-ketosteroid excretion of these individuals also has a major rhythm which not only matches the behavioural rhythm but precedes it. As a working hypothesis it is assumed that these 17-ketosteroid rhythms represent aberrations of cyclical gonadotrophic (not corticotrophic) activity. This hypothesis seems to be fruitful since clomiphene citrate, which specifically corrects certain abnormalities of gonadotrophic activity, appears to have exerted a highly beneficial effect in three women with recurrent psychoses. In the biochemical laboratories of the Unit, Mr. L. Huszka has developed a method of measuring the blood redox potential. A survey of schizophrenic patients is being conducted for comparison with the findings in a group of healthy controls. In the Clinical Physiology laboratory, Mr. J. Mourant continues his survey of the cerebral vascular status of patients with various forms of psychiatric disturbance. Quantification techniques applied to the REG recording are now permitting correlations with various aspects of psychiatric status.

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RADIOLOGY

Under the direction of Professor R. Brian Holmes

During the year the Department began a major review of its role, with particular attention to undergraduate and graduate teaching as well as research. This, we hope, will lead to a programme which will more effectively serve the needs of the medical

student as well as the man pursuing specialty training.

The course leading to the Diploma in Medical Radiology has attracted the usual number of students. The majority have come from the ranks of general practice and are interested in returning to community practice of radiology. Although the training of men for this function is one of the Department's major responsibilities, it is desirable that we attract a greater number who are interested in an academic career. This is one of the problems currently under study.

The different hospital departments suffer to varying degrees from understaffing. Service requirements in the face of the shortages mean that the university functions tend to be compromised. Active recruitment for new staff, we hope, will alleviate

this situation.

The Department has been pleased to welcome the following visitors during the year: Professor Russell H. Morgan, Johns Hopkins University; Professor Stanley M. Rogoff, University of Rochester; Professor Edward D. B. Neuhauser, Harvard University; Professor Donald L. McRae, McGill University; Dr. Richard Marshak, Mount Sinai Hospital, New York.

SCHOLARLY ADDRESSES

W. E. C. Allt, "Oral Cancer," Meeting of Staff at State University of New York, Upstate Medical Centre, Syracuse, May 1966. F. A. Beale, "Cancer of Ovary, Radiotherapeutic Considerations in Treatment of Ovarian Cancer and Selection of Patients for Therapy at The Princess Margaret Hospital," Ontario Cancer Treatment and Research Foundation Conference, Windsor, November 1965; "Lymphangiography," XIth International Congress of Radiology, Rome, Italy, September 1965; "Lymphography in the Investigation of Urological Malignancy," American College of Surgeons, Cleveland Sectional Meeting, March 1966. R. F. Colapinto, "Arteriography in Tumours of the Liver and Pancreas," Canadian Association of Radiologists, Montreal, March 1966. P. J. FITZPATRICK, "The Influence of Ovarian Irradiation and Prednisone on Recurrence Rate and Survival of Carcinoma of the Breast," Meeting of the Surgical Staff at the Toronto East General Hospital, October 1965. R. B. Holmes, "Peripheral Arteriography" and "Peripheral Venography," Guest Faculty of the Symposium on Cardiovascular Disease, University of Kentucky Medical Centre, May 1966. R. D. T. Jenkin, "Hodgkin's Disease in Children," Canadian Association of Radiologists, Montreal, March 1966. E. L. LANSDOWN, "Radiologic Aspects of Coronary Artery Disease," Canadian Association of Radiologists, Montreal, March 1966; with Dr. D. C. F. Harwood-Nash, "Re-evaluation of the Urea Washout Test in the Assessment of Renal Vascular Insufficiency," Canadian Association of Radiologists, Montreal, March 1966. N. L. Patt, "Technique and Interpretation of Mastoid Radiographs," Ontario Medical Association, Section of Otolaryngology, Toronto, May 1966. M. V. Peters, "Management of Hodgkin's

Disease by Radiotherapy," American Roentgen Ray Society, Washington, September 1965; "Prophylactic Treatment of Adjacent Areas," Symposium on Hodgkin's Disease, Rye, New York, September 1965; "The Natural History of Hodgkin's Disease as Related to Staging," American Cancer Society, New York, November 1965; "The Radiotherapy Management of the Lymphomas," Radiological Society of North America, Chicago, November 1965; "The Scope of Radiotherapy in Hodgkin's Disease," Wisconsin Radiological Society, September 1965. B. J. Reilly, "Infantile Pyelonephritis," European Society of Paediatric Radiology, London, England, May 1966; with Dr. D. C. F. Harwood-Nash, "Routine Visualization of the Inferior Venae Cava in Paediatric Intravenous Pyelography," Canadian Association of Radiologists, Montreal, March 1966. W. D. RIDER, "Changing Aspects in Malignant Disease," Peterborough Medical Meeting, March 1966; "Total Body Irradiation in the Management of Ewing's Tumour," Canadian Association of Radiologists, Montreal, March 1966. D. E. Sanders, "Pleural Mesothelioma," Canadian Association of Radiologists, Montreal, March 1966. W. J. SIMPSON, "Carcinoma of Thyroid," XIth International Congress of Radiology, Rome, Italy, September 1965; "Follicular Thyroid Carcinoma," Canadian Association of Radiologists, Montreal, March 1966; "Liver Scanning with Radioactive Isotopes," Ontario Medical Association, Spring Meeting, Toronto, May 1966; "Stump the Panel," a session on Scans, Society of Nuclear Medicine, Eastern Great Lakes Chapter, Rochester, New York, November 1965; "Use of Radiophosphorus and Radioiodine in the Investigation of Thyroid Nodules," Society of Nuclear Medicine, Bal Harbor, Florida, June 1965. G. Wortzman, "Positive Contrast Myelography of the Posterior Fossa," Canadian Congress of Neurological Sciences, Toronto, June 1966.

RESEARCH

Dr. G. S. Bird, in conjunction with Dr. J. E. Mullens, Department of Surgery, is continuing the analysis of esophageal hiatal hernia, with special reference to the correlation of X-ray and clinical findings, under a grant from the Wellesley Hospital Research Foundation.

Dr. R. F. Colapinto is studying the celiac angiogram in liver neoplasia and, with Dr. D. E. Wood and Dr. E. G. King, Department of Laboratories, Division of Nuclear Medicine, comparing the selective arteriogram and the selective isotopic scan of liver and pancreas. Dr. Colapinto, in association with Dr. F. G. Pearson, Department of Surgery, is also studying by selective arteriography the revascularization of the autotransplanted lung.

Dr. J. H. Gardiner is continuing his studies on the temporo-mandibular joints. Dr. A. Humphry and Dr. J. D. Munn are carrying out a study on the effect of tannic acid on patients who have had barium enema examinations in the past.

Dr. E. L. Lansdown, in conjunction with Dr. E. D. Wigle and Dr. H. E. Aldridge, Department of Medicine, is carrying out studies on diastolic mitral insufficiency.

Dr. H. E. Meema is pursuing his studies of cortical bone measurements in

metabolic bone disease.

Dr. C. A. F. Moes is carrying out the following projects:

(a) Angiocardiographic studies in dextrocardia, in conjunction with the Department of Cardiology. The results of this study have been accepted for publication.

(b) Angiocardiographic findings in complete transposition of the great vessels

and corrected transposition of the great vessels.

(c) Angiocardiographic findings in transposition of the great vessels in associa-

tion with pulmonary stenosis.

(d) Investigation of infundibulum as demonstrated angiocardiographically in pulmonary stenosis with normal aortic root, in tetralogy of Fallot, and in ventricular septal defect with right ventricular outflow tract obstruction.

The following research projects, supported by the Ontario Cancer Treatment and Research Foundation, are conducted by members of the Department of Radiotherapy:

1. Plasma protein studies in malignant disease	\$20,000
2. Investigational studies with the whole body	10,300
3. Immunotherapy in the management of choriocarcinoma	12,600
4. Immunization of patients with a diazotized extract of their own	
tumours	12,040
5. A Sr ⁹⁰ electron beam therapy unit	10,000
6. Ovarian irradiation and prednisone following mastectomy in	
carcinoma of the breast	18,401
7. Relationship of metastatic bone disease and hypercalcaemia to	
secondary parathyroid hyperplasia	5,000

Publications

GARDINER, J. H. "Radiologic Observations Associated with Phenacetin Overdosage" (Journal of the Canadian Association of Radiologists, vol. 17, no. 1, March, 1966, pp. 21-8).

HOLMES, R. B. et al. "Sinus of Valsalva Aneurysms" (Journal of the Canadian Association of

Radiologists, vol. 16, no. 4, Dec., 1965, pp. 254-61).

Jenkin, R. D. T. "Ewing's Sarcoma: A Study of Treatment Methods" (Journal of the Faculty of Radiologists, vol. 17, no. 2, April, 1966, pp. 97-106).

Keith, J. D. and Moes, C. A. F. "Selective Angiocardiography"; in Intravascular Catheterization (2nd ed.), ed. Henry A. Zimmerman, pp. 225-87. Springfield, Illinois: Charles C.

Thomas. 1966. MEEMA, H. E. et al. "Possible Estrogenic Effect on Bone in Postmenopausal Patients with

Mammary Carcinoma" (Cancer, vol. 19, no. 3, March, 1966, pp. 433-436).

MEEMA, H. E., BUNKER, M. L. et al. "Loss of Compact Bone due to Menopause" (Obstetrics

and Gynecology, vol. 26, no. 3, Sept., 1965, pp. 333-43).

Moes, C. A. F. and Munn, M. D. "The Value of Knee Arthrography in Children" (Journal

of the Canadian Association of Radiologists, vol. 16, no. 4, Dec., 1965, pp. 226-33).

MORLEY, T. P. and WORTZMAN, GEORGE. "The Importance of the Lateral Extensions of the Sphenoidal Sinus in Post-Traumatic Cerebrospinal Rhinorrhoea and Meningitis: Clinical and Radiological Aspects" (Journal of Neurosurgery, vol. 22, no. 4, 1965, pp. 326-32). Peters, M. V. "Hodgkin's Disease is Curable—If" (Consultant, vol. 5, no. 2, May, 1966,

pp. 7–10). "Natural History of Hodgkin's Disease as Related to Staging" (Cancer, vol. 19, no. 3,

March, 1966, pp. 308–16).

- "Résultats lointains du traitement de la maladie de Hodgkin" (Nouvelle Revue française d'hématologie, tome 6, no. 1, 1966, pp. 60-73).

SANDERS, D. E. "Angiographic Diagnosis of Hydatidiform Mole" (Journal of the Canadian Association of Radiologists, vol. 16, no. 3, Sept., 1965, pp. 156-60).

SIMPSON, W. J. K. "The Failure of Radiophosphorus to Identify Malignant Solitary Thyroid

Nodules" (Journal of Nuclear Medicine, vol. 6, no. 12, Dec., 1965, pp. 917-21).

SIMPSON, W. J. K. et al. "Total Body Scanning with Strontium⁸⁵ in the Diagnosis of Metastatic Bone Disease" (Canadian Medical Association Journal, vol. 93, no. 24, Dec., 1965, pp. 1237–42).

SURGERY

Under the Direction of Professor F. G. Kergin

By coincidence, a remarkable number of changes will take place at the end of this year in the personnel of the Department. The surgeons-in-chief of three of the largest hospitals are retiring from the active staff to continue in private consulting practice.

Dr. W. Keith Welsh left the staff of the Toronto General Hospital in 1947 to become Surgeon-in-Chief at St. Michael's Hospital. His outstanding judgment and skill as a clinical surgeon have strengthened the undergraduate teaching programme and even more particularly the graduate training programme of this Department.

During the years that he has guided the Department he has developed a strong staff who will give loyal support to Dr. W. J. Horsey who will succeed him. Dr. Horsey

is the senior neurosurgeon to the hospital.

Dr. R. C. Laird became Surgeon-in-Chief of the Toronto Western Hospital in 1946. The intervening years have seen many major developments in the hospital as a teaching and research institution, developments in which Dr. Laird has played a very significant part. As the plans which he has helped to formulate continue to unfold, his influence will be felt for many years to come. Dr. D. R. Wilson, who is the senior cardiovascular surgeon to the hospital, will succeed him as Surgeon-in-Chief.

Dr. A. W. Farmer accepted the appointment as Surgeon-in-Chief at the Hospital for Sick Children in 1956. Recognizing that the obligations of a great special hospital such as that could not be met unless members of the staff concentrated their interests in special fields of surgery, he developed the specialty divisions within the Department. This has resulted in better patient care, in greatly enhanced productivity in clinical and basic research and in the provision of a unique opportunity for training in the various specialties in paediatric surgery. He was also responsible for the development of a very active division of surgical research in the Research Institute of the hospital, the division now being under the able direction of Dr. Walter Zingg. Dr. Farmer leaves a strong and highly organized department to his successor, who is Dr. R. B. Salter, the senior orthopaedic surgeon to the hospital.

Dr. Jessie Gray has guided the Department of Surgery of the Women's College Hospital since 1946 and has supervised the undergraduate surgical teaching in that hospital since it was initiated in 1959. Because of ill health she resigned her appointment at the end of 1965. We are glad to know that she has made a good recovery and wish her happiness in her retirement from active surgical practice. On Dr. Gray's retirement, Dr. Marjorie Davis was appointed the Surgeon-in-Chief of the hospital.

Dr. D. R. Mitchell also retires this year from the active staff to continue in private practice. Dr. Mitchell has been the senior urologist to the Toronto General Hospital for seventeen years and has combined great skill as a clinical surgeon with

a continuing interest in undergraduate teaching.

The members of the Department, and a great number of friends outside the Department, were saddened by the sudden death of Dr. Carl Aberhart in May. Dr. Aberhart was an urologist of outstanding judgment and ability and a great teacher. Following distinguished service as a surgical specialist in the Royal Canadian Army Medical Corps during World War II, he continued as a member of the staff of the Toronto General Hospital. However, his major interest was the development of the Division of Urology at Sunnybrook Hospital (DVA) into one of the most active and efficient in Canada, with a strong graduate training programme. In 1959 he was appointed Director of Surgery of Sunnybrook Hospital, an appointment in which his competence was such that it was anticipated that when the hospital is taken over as a university teaching hospital he would carry on as Surgeon-in-Chief. His death is a great loss to the hospital and to the University.

The teaching potential of the Department in the coming year will be strengthened by a significant increase in the departmental budget which has provided for the appointment of several full-time teachers. Dr. J. G. Moffat and Dr. A. J. Davies will both join the general surgical services of the Toronto General Hospital, and Dr. G. A. Farrow the Division of Urology of that hospital. Dr. R. E. Mathews will join the Division of General Surgery, and Dr. T. A. Wright the Division of Orthopaedic

Surgery of the Toronto Western Hospital.

We recognize that one of the obligations of a great medical school is to attract able people and to provide an opportunity for them to develop and demonstrate their teaching, research and clinical potential so that they may qualify for larger responsibilities in other medical schools. The group of cardiovascular surgeons in this Department, under the leadership of Dr. W. G. Bigelow, has been particularly productive of such individuals. Dr. W. Sapirstein, who has been very active in the

Division of Cardiovascular Surgery of St. Michael's Hospital, has resigned to accept a position as assistant professor in the Division of Thoracic Surgery of Boston University at the Boston City Hospital. Dr. W. B. Firor has resigned his position as a clinical teacher in the Department and a member of the Division of Cardiovascular Surgery at the Toronto General Hospital to accept an appointment as assistant professor in the University of Saskatchewan in charge of cardiovascular surgery. Our good wishes go with Dr. Sapirstein and Dr. Firor.

At the request of Dean Hamilton, a curriculum committee has been established in the Department and placed under the able chairmanship of Dr. N. T. McPhedran with representation from the Department of Surgery of each of the teaching hospitals. This has been a hard-working committee which has already submitted a preliminary report to Dr. Wightman's central committee for the clinical departments. Dr. McPhedran's committee has made some recommendations which, at least to this

medical school, are novel and challenging.

During the year we have been honoured by visits from many distinguished surgeons. In April, Sir Eric Riches spent two weeks as a visiting professor and delivered the Balfour Lecture on the topic "The Natural History of Tumours of the Urinary Tract." Mr. B. Barratt-Boyes of Auckland, New Zealand, was a visiting professor for a week. He lectured to our students, residents and staff and also demonstrated his technique for subcoronary placement of an aortic homograft valve. In addition we have had visits of lesser duration from Dr. V. Bjork of Uppsala, Dr. Eric Carlens of Stockholm, Mr. Robertson of Sheffield, Mr. R. Turner Warwick of London, Dr. Fraser Gurd of Montreal, Dr. P. I. Branemark of Goteberg, Mr. R. B. Wright of Glasgow, Dr. Jan Nauta of Leiden and Mr. Hugh Barrie of Sydney, Australia.

Finally, in this my ninth departmental report to the Dean, I must record the pride and gratitude with which I leave the Department: pride in the accomplishments of its members and gratitude for their unstinting support and co-operation. I have resigned from the Chair of Surgery to accept an appointment as Associate Dean with special responsibility for the development of Sunnybrook Hospital into a modern teaching hospital. My successor is Dr. W. R. Drucker who comes to us from the Department of Surgery of Western Reserve University with an established reputation as a teacher, clinical surgeon and researcher. I fully expect that he will receive the same support that I have enjoyed and that his energy and ability will add fresh impetus to a great Department of Surgery.

I cannot leave the Department without a special word of thanks and commendation to Miss Jean Lucas, the departmental secretary. Over the years she has not only handled departmental routine with great efficiency but she has also cheerfully given of her time and effort to assist undergraduate and graduate students and members of the staff with innumerable problems quite unrelated to her normal duties. It has

been a pleasure to work with her.

SCHOLARLY ADDRESSES

Professor W. G. Bigelow, Annual Lecture to the Alpha Omega Alpha Honour Medical Society of the University of Western Ontario; "Late Follow-Up Studies of the Results of Internal Mammary Implantation for Coronary Heart Disease," American Surgical Association; "The Ventriculo-Myotomy Operation for Muscular Subaortic Stenosis: A Re-Appraisal," American Association for Thoracic Surgery. Professor N. C. Delarue, "A Re-evalution of the Use of Adrenalectomy in the Management of Metastatic Mammary Carcinoma," International Union Against Cancer, Lyon, France; "The Rationale for Intensive Pre-Operative Investigation of Lung Cancer," and "Pre-Operative Irradiation in Locally Advanced Breast Cancer," 11th Annual Cancer Symposium of the Saskatchewan Cancer Commission. Professor F. P. Dewar, "Management of Painful Spondylolisthesis," and the "McMurray Osteotomy," Orthopaedic Association of Tennessee, Orthopaedic Association of the

Atlantic Provinces. Dr. R. O. Heimbecker, "Emergency Pulmonary Embolectomy," Guelph and District Medical Society; "Progress in Cardiac Surgery," and "Progress in Vascular Surgery," University of Western Ontario; "Advances in Cardiovascular Surgery," University of Toronto Annual Medical Alumni meeting; "Progress in Tumour Perfusion," Surgical Staff of St. Joseph's Hospital, Toronto. Professor R. D. Jeffs, "Peritoneal Dialysis in Children," Medical Services Seminar, Kingston,

Jamaica.

Dr. P. Klotz, "Chronic Pyelonephritis," Canadian Medical Association. Pro-FESSOR W. M. LOUGHEED, "Surgery of Intracranial Vascular Occlusion," University of Vermont. Professor D. L. Macintosh, "Arthroplasty of the Knee in Rheumatoid Arthritis," British Orthopaedic Association. Professor I. Macnab, "Surgery of Rheumatoid Arthritis," Smiths Falls Medical Association; "Trauma of the Road," Manitoba Medical Association; "Acceleration-Extension Injury of the Neck," Mayo Clinic; "Low Back Pain" and "Shoulder Pain," American Academy of Orthopaedic Surgeons; "Whip Lash Injuries of the Neck," American Academy of Surgeons; "Pain and Disability," New York State University, Buffalo; "Pre-Operative Assessment of Low Back Pain," "Spondylolisthesis" and "Anterior Occipito-Axial Fusions," Baylor University; "Clinical Management of Whip Lash Injuries of the Neck," International College of Surgeons; "The Painful Shoulder," Ontario Medical Association; "Fractures of the Tibia," Massachusetts General Hospital, Boston. Professor T. P. Morley, "An Evaluation of Macro-Aggregates of Radioactive Iodinated Human Serum Albumin (RIHSA) in the Diagnosis of Brain Tumours: An Experimental and Clinical Study," Society of Neurological Surgeons, Neurosurgical Society of America. Professor W. T. Mustard, "Cardiac Surgery in the Newborn and Small

Infant," American College of Surgeons Clinical Congress.

Dr. F. G. Pearson, "Malignant Pleural Effusion" and "Mediastinoscopy," British Columbia Respiratory Disease Symposium; "Tracheal Reconstruction," Royal College of Physicians and Surgeons of Canada annual meeting; "Mediastinoscopy," Academy of Medicine of Toronto; "Talc Poudrage," the Kitchener Surgical Society; "Early Detection of Bronchial Carcinoma," staff of the Henderson General Hospital, Hamilton, Ontario. Dr. G. F. Pennal, "Stress Studies of the Lumbar Spine," the British Orthopaedic Association. Dr. G. A. Trusler, "Observations on the Use of THAM in Acute Cyanotic Cardiac Failure," Canadian Cardiovascular Society. Dr. A. M. Wiley, "Osteoarthritis of the Knee: Pathological and Clinical Aspects," Canadian Orthopaedic Association. Professor R. B. Salter, "Experimental and Clinical Aspects of Congenital Dislocation of the Hip," "Investigation of Avascular Necrosis of the Femoral Head," and "Etiology and Pathogenesis of Congenital Dislocation of the Hip," Orthopaedic Surgeons of Israel; "Surgical Treatment of Congenital Dislocation of the Hip" and "Diagnosis and Treatment of Legg-Perthes" Disease," University of Montreal; "Innominate Osteotomy for Dislocation of the Hip," Orthopaedic Surgeons of Long Island (the Hudson Lecture); "Clinical and Experimental Aspects of Legg-Perthes' Disease," Western Reserve University; "Results of Innominate Osteotomy: First Five Years' Experience," New York Academy of Medicine; "Results of Innominate Osteotomy: First Five Years' Experience," Centennial meeting of the New York Orthopaedic Hospital; "Injuries Involving the Epiphyseal Plate," "Fractures of the Lateral Condyle of the Humerus" and "Supracondylar Fractures of the Humerus," American Medical Association, Chicago; "Fractures in Childhood" (3 lectures), American College of Surgeons-Philadelphia Course on Trauma; "Principles of Fracture Treatment in Children" (3 lectures), University of Manitoba Course on Trauma; "Prevention of Avascular Necrosis of the Femoral Head in Young Children," University of New Mexico, Albuquerque.

RESEARCH

Cardiovascular Surgery

The members of the Division of Cardiovascular Surgery of the Toronto General Hospital have had a very active and productive year in the fields of both experimental and clinical research. Dr. W. G. Bigelow, in collaboration with Dr. W. B. Firor and

Dr. J. A. Armour, has continued experimental development of a batteryless cardiac pacemaker. With Dr. E. D. Wigle, of the Department of Medicine, and Dr. A. S. Trimble, Dr. Bigelow has done a follow-up study of patients treated for subaortic muscular stenosis; with Dr. H. E. Aldridge and Dr. D. C. MacGregor a follow-up study, extending for as long as thirteen years, of thirty-two patients treated for disabling angina pectoris by the Vineberg internal mammary transplant operation; with Dr. B. S. Goldman a study of fifty patients who have had the aortic valve replaced by a Starr valve, and with Drs. H. E. Aldridge and I. H. Kipton a study of patients with Starr valve replacement of the mitral valve.

Dr. J. A. Key has carried out a survey of patients treated surgically for

abdominal aortic aneurysm over a ten year period.

Dr. R. O. Heimbecker, assisted by Dr. C. Chen, has investigated experimentally a suggestion made a good many years ago by Dr. D. W. G. Murray of this department. In a large number of dogs and calves he has produced an acute myocardial infarct and has demonstrated improved survival and function after excision of the infarct. He has also studied experimentally heterograft replacement of the tricuspid

valve and the microcirculation under hyperbaric conditions.

Dr. A. S. Trimble, with the help of Dr. B. Bharadwaj, Dr. G. P. Kim and Dr. T. A. McLellan, has undertaken a number of experimental studies. Many observations have been made on the effects of lung re-implantation, and lung transplantation. Under cardiopulmonary by-pass and local hypothermia the canine heart has been re-implanted with consistent short-term success. Using a pulse duplicator a study has been made of the mechanical factors involved in the function of the re-implanted aortic valve in the excised heart. A study is under way of the histological changes in bovine heart valves under various methods of preservation and storage.

Dr. H. F. Robertson, in the laboratory, has confirmed the accuracy of the tetrazolium rapid staining technique for delineating areas of early myocardial infarction and also has confirmed that the application of hydrogen peroxide by various methods to the rabbit's heart does not improve survival after production of

an infarct.

At the Toronto Western Hospital, Dr. R. J. Baird has been assisted by Dr. E. H. Spratt in several experimental projects. The possibility of revascularization of the heart by implanting segments of autologous femoral artery and saphenous vein into ischemic and normal myocardium has been investigated; the mitral valve has been replaced with homologous aortic and mitral valves and the effects on femoral arterial flow of varying femoral venous pressure has been studied. Clinical reviews have been completed on a series of patients treated at the Toronto General Hospital and the Toronto Western Hospital for popliteal aneurysm, and on another series of patients treated at the same two hospitals for false aneurysm. The results obtained by surgical treatment for renovascular hypertension have been reviewed.

At the Hospital for Sick Children Dr. W. T. Mustard has continued his development of a new type of membrane oxygenator and also has experimentally studied the possibility of replacing the wall of the right ventricle with a pedicle graft of diaphragm which is artificially paced. Dr. G. A. Trusler has been examining the effects of growth

on homograft and prosthetic heart valves placed in young calves.

At St. Michael's Hospital Dr. Wolf Sapirstein has investigated experimentally the changes in cardiorespiratory function following superior vena cava-pulmonary artery anastomoses.

General Surgery

Assisted by Dr. J. A. Starr, Dr. N. C. Delarue has continued the large-scale sputum cytology survey of individuals who are considered to be in a high-risk category from lung cancer. The long-term follow-up study of patients, who in the past have been shown to have cells in circulation which were considered malignant, is being continued and in addition a study is under way to evaluate the effectiveness of modified radical mastectomy in the treatment of carcinoma of the breast.

Dr. Bernard Langer has been assisted by Dr. Ian MacKay and has collaborated

with Dr. J. Steiner of the Department of Pathology in a study of the histological changes occurring in liver homotransplants in the dog without attempted suppression of the rejection phenomenon. It has been found that certain biochemical changes parallel the deterioration of the liver. The study is being continued with attempts

to modify the rejection reaction.

Dr. N. T. McPhedran has directed Dr. Robert Stone in a continued search for hormones originating in the pancreas which affect gastric secretory activity. They have failed to find a gastrin-like hormone but from the pancreas of dogs, made cirrhotic by administration of carbon tetrachloride, they have extracted a substance which has an inhibitary influence on gastric secretion. They are also investigating the cause of marked gastric hyper-secretion immediately following ligation of the portal vein.

Dr. R. A. Mustard has carried out a clinical study of the value of I¹³¹ scans and T.S.H. suppression in the investigation of nodular goitre. He has also investigated the incidence of the Frey syndrome in patients subjected to parotidectomy and the

value of section of the auriculo-temporal in preventing the syndrome.

Dr. F. G. Pearson has been assisted by Dr. Robert Stone in several experimental studies. The effects of heavy irradiation by a Cobalt unit on tracheal replacement by heavy Marlex mesh in the dog were investigated. It was found that whether given before or after tracheal repair the irradiation prevented successful incorporation of the graft. Using the Mark V, N.R.C. stapling instrument, attempts to replace the upper oesophagus by a transplanted segment of jejunum have met with some success. An experimental method was evolved for complete division of the bronchial artery circulation to a lung. The effects on the lung were studied in detail and also the re-establishment of the circulation as assessed by selective bronchial artery angiography and injection preparations.

During the year, the new research laboratories at St. Michael's Hospital became active with Dr. D. J. Currie as Director. Dr. Currie has been studying changes in the dog's gallbladder caused by the introduction of non-reactive foreign bodies in the lumen and also the effects of a high cholesterol intake combined with various modifications of diet on cholesterol storage disease in the rabbit. As a clinical study he has investigated sodium and water retention in patients given excessive volumes

of intravenous saline in the early post-operative period.

Dr. L. J. Mahoney is conducting a study on rats to investigate factors resulting in adhesions of tendons in a fibro-osseus tunnel. With Dr. P. J. Moloney of the Connaught Laboratories, he continues to investigate the effectiveness of a 50 unit prophylactic dose of human tetanus antitoxin in non-immunized individuals.

Dr. J. A. MacDonald has completed a study which shows that the administration of large doses of calcium to rats did not inhibit the growth of the Walker 256 tumour

or reduce the incidence of metastases.

At the Hospital for Sick Children several clinical studies are under way. Dr. J. C. Fallis is conducting a review of all patients who, during the past twelve years, were suspected of or known to have incomplete rotation of the midgut or a similar anomaly. Dr. B. Shandling is conducting a follow-up study of patients treated for imperforate anus, Hirschspring's disease or tracheo-oesophageal fistula.

At the Toronto Western Hospital, Dr. R. H. Wilkinson is conducting clinical pH

and pressure studies at the oesophago-gastric junction.

Dr. R. I. Mitchell, of the staff of the Wellesley Hospital, has collaborated with Dr. A. M. Rappaport of the Department of Physiology in developing a technique

for experimental auto-transplantation of the pancreas.

At the New Mount Sinai Hospital, Dr. I. H. Koven has made a clinical study of the effect of ambulation on the blood volume of post-operative patients and of the efficacy of lincomycin in the treatment of minor infections.

Neurosurgery

Dr. T. P. Morley, at the Toronto General Hospital, has supervised Dr. E. G.

King in an experimental and clinical evaluation of macro-aggregates of radioactive iodinated human serum albumin in the diagnosis of brain tumours. Dr. W. M. Lougheed has been associated with Dr. R. G. Elgie in studying the effects of induced spasm of arteries of the cat's brain and also in a careful follow-up review of 106 patients who have had carotid endarterectomy during a ten-year period. Also at the Toronto General Hospital and in the laboratories of the Banting Institute, Dr. R. R. Tasker has conducted an active programme of research. With Dr. F. Langer the study of tremorine tremor has been continued in the rat brain stem and in the squirrel monkey using micro-electrodes to record unit activity. The sensory deprivation study in collaboration with Dr. R. Pos continues. Accumulated follow-up data on patients treated surgically for Parkinson's disease is being programmed for computer analysis and in these patients techniques for quantitative assessment using polygraphs are being investigated with Dr. Lim. A number of studies are being carried out in the course of stereotaxis: with Professor R. Emmers of Columbia University a mapping study of the human sensory thalamus; with Dr. L. Organ, of the Institute of Biomedical Electronics, the measurement of brain impedance as a means of localization in stereotaxis; by the use of micro-electrodes the activity of single cells in the human brain is being studied; with the assistance of Dr. Lim the H-reflex is being measured during stereotactic surgery to aid in localization and to explore the mechanism of dyskinesia. A clinical study is being made of the effect of stereotactic lesions in the thalamus as a means of relieving intractable pain.

At the Hospital for Sick Children, Dr. E. B. Hendrick and Dr. H. J. Hoffman have been assisted by Dr. J. Francouer in a study of arterio-venous malformations in children and by Dr. W. J. O'Callaghan in a review of brain abscesses in children. Dr. Hoffman continues his investigation of the effect of steroid therapy on cerebral

oedema.

At the Toronto Western Hospital, Dr. J. F. R. Fleming is investigating the effect of dexamethasone on the oedema associated with thalamatomy lesions in cats and also is making a clinical trial of carbamazepine therapy in trigeminal neuralgia.

Orthopaedic Surgery

At the Hospital for Sick Children Dr. R. B. Salter directed a number of studies, both experimental and clinical. An investigation with Dr. M. Bell of the healing process of induced avascular necrosis of the femoral head in young pigs has thrown significant light on the pathology of Legg-Perthes' disease and has given support to the rationale of treating some children for this condition by innominate osteotomy and full weight-bearing. With Dr. Robert Humphreys, Dr. Salter has studied experimental traumatic arthritis in the rabbit and the effects of repeated hemarthroses in dogs rendered vulnerable by alteration of the clotting mechanism. With Dr. R. Agarwal, Dr. Walter is surveying the results of 166 innominate osteotomy operations performed over a period of five years, and with Dr. M. Bell, the results of this operation performed for Legg-Perthes' disease. With Dr. C. Zaltz he has surveyed the results of an operation designed for the treatment of hallux valgus in adolescents and with Dr. J. Schatzker has conducted a study of congenital muscular torticollis. Dr. J. E. Hall has continued his clinical study of respiratory function in children affected by scoliosis and continues as Director of the Prosthetic Unit of the Crippled Children's Centre. Dr. D. A. Gibson is associated with Dr. Llewellyn-Thomas of the Institute of Biomedical Electronics in a study of the effect of tendon lengthening on muscle efficiency. Dr. W. P. Bobechko continues his investigation of auto-immune reactions in articular cartilage.

Dr. R. W. Jackson, who is supported in part by a Markle Foundation Scholar-ship, has been appointed Director of the enlarged Orthopaedic Research Laboratories of the Banting Institute and has spent the year preparing the laboratories for an ambitious programme of experimental research. During the year he began a clinical study of the place of arthroscopy in the diagnosis and treatment of derangements of the knee joint. Dr. W. R. Harris has continued his studies of the epiphyseal plate

and with Dr. G. Seligman has investigated the pathological changes related to the plate in experimentally induced rickets. In association with Dr. J. D. Shortt, Dr. Ian Macnab has completed his experimental study of the effect of chymopapain on the nucleus pulposis and of its toxicity. He has concluded that there is a sufficient margin between the therapeutic dose and a toxic dose so that the substance may be used safely in a clinical trial. In a pilot study with Dr. W. J. Anderson of the Department of Pathology, a method has been developed for assessing the blood supply and nutrition of tendons, with special reference to the rotator cuff, and support has been obtained from the Workmen's Compensation Board of Ontario for a continuation of this project.

At St. Michael's Hospital Dr. J. G. Evans and Dr. R. H. N. Fielden are collaborating in a clinical study of the results of salvage procedures for severely damaged hip joints. Dr. Fielden is also commencing an experimental investigation of the relationship between changes in apophyseal joints of the lumbar spine and lesions

of the intervertebral discs.

At the Toronto Western Hospital Dr. A. M. Wiley is investigating the relative effects of early or delayed joint mobilization following synovectomy of the knee joint. Dr. T. A. Wright, in association with members of the Department of Anatomy, is continuing investigations which were begun in Edinburgh of the anatomy and physiology of the interphalangeal joints of the human finger.

At St. Joseph's Hospital, Dr. G. F. Pennal and Dr. G. A. McDonald continue their clinical studies of the anatomy and physiology of the lumbar spine and of the

abnormalities which result in low back pain.

Plastic Surgery

At the Hospital for Sick Children, Dr. W. K. Lindsay, assisted by Dr. I. Munro and in collaboration with Dr. S. H. Jackson of the Division of Biochemistry, has continued his detailed basic studies of the biochemistry of tendon healing and has extended this into an investigation of the influence of artificial tendons on healing and function. With Dr. W. T. Sorokolit he has completed a long-term study of infants with lymphangioma and with Dr. J. R. Birch and Dr. R. B. Ross, D.D.S., he is conducting a study of the bony and soft tissue changes in the face and skull which may be present in individuals born with complete clefts of lip and palate. Also, at the Hospital for Sick Children, Dr. H. G. Thomson has continued his investigation of various techniques for altering skin colour by tatooing, using pigs as the experimental animal, and of tendon function and repair in monkey hands. He has completed a clinical study of the results of cross-finger pedicle grafts in children and is initiating other clinical studies.

At the Toronto General Hospital, Dr. R. A. Newton has carried out an investigation of the influence of oxygen infusion on the survival of pedicle skin flaps in rats.

Urology

At the Toronto Western Hospital, Dr. P. O. Crassweller has completed his investigation of factors involved in recurrent stone formation and continues the clinical study of the value of nitrogen mustard therapy as an adjunct in the treatment of bladder tumours.

At St. Michael's Hospital, Dr. Vincent Colapinto has conducted laboratory

experiments on methods of preserving the isolated kidney for transplantation.

Dr. Ara Keresteci has continued his laboratory and clinical investigation of the effect of breathing oxygen in high concentration as a means of enhancing the efficacy of radiotherapy in the treatment of bladder tumours. The clinical work is in collaboration with the staff of the Princess Margaret Hospital.

At the Hospital for Sick Children, Dr. R. D. Jeffs has succeeded in producing acute pyelonephritis in the experimental animal but has not, as yet, evolved a model

which consistently results in chronic pyelonephritis.

At the New Mount Sinai Hospital, Dr. P. Klotz is studying the effect of hyperbaric oxygen on experimentally induced chronic pyelonephritis in rats.

At the Toronto Hospital, Weston, Dr. G. Gale has completed a follow-up study

of 1,000 patients who have been treated for genito-urinary tuberculosis.

Dr. W. K. Kerr has been assisted by Dr. Guy Bedard in a continuation of the investigation of the effect of smoking on the production of bladder carcinogens and also, in collaboration with the Department of Pathology, in a clinical study at the Toronto General Hospital and the Princess Margaret Hospital of the value of exfoliative cytology in the diagnosis of tumours of the urinary tract.

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THERAPEUTICS

Under the direction of Professor R. W. Gunton

For several reasons the future of the Department deserves, at this moment, more careful consideration than a report of the past year. The resignation of the present head, to take a post at another university, is the least important of the reasons requiring this scrutiny and is unrelated to them. Organizing committees of new medical schools are not creating separate Departments of Therapeutics and only a few remain in older schools. The issue must be faced whether the Department should continue to exist or whether it should be merged with Medicine or Pharmacology. Advice has been received from some competent sources favouring the second view. The emergence of Clinical Pharmacology as a separate, new discipline has put Therapeutics in an uncomfortable squeeze between it and Medicine. Advocates of the dissolution of Therapeutics question the justification for two disciplines which appear on superficial inspection to cover the same ground. In this Faculty, this point of view is given additional emphasis and cogency by the planned decentralization into four clinical schools for the last two and one half years of the medical course. The resulting reorganization of the curriculum will almost certainly require that some basic Pharmacology be taught in the clinical years and it is reasonable to propose that this should be done by clinical pharmacologists attached to hospitals and holding joint appointments in Pharmacology and Medicine. If this comes into effect, should a university Department of Therapeutics also have divisions in each of the clinical schools? The answer would almost certainly be returned in the negative if the judgment were made on the basis of administrative comfort and tidiness or if it were made on the too casual conclusion that Clinical Pharmacology and Therapeutics are very nearly the same subject. If it were decided that subdivisions of Therapeutics in each clinical school were unnecessary, then a headquarters or university department would be anomalous and would in all likelihood be dissolved.

The real danger here is that the instruction of medical students may suffer from an impeccable administrative decision based on an incorrect premise but forced by the circumstances of decentralization and emergence of Clinical Pharmacology. The premise is incorrect because Clinical Pharmacology and Therapeutics are not similar in content and purpose. Clinical Pharmacology is the study of the action of drugs in man. It is a scientific discipline in which the primary purpose is the acquisition of knowledge about the drug, its absorption, pharmacologic effects, metabolism and toxicity in man. Therapeutics is the art and science of treatment. It encompasses all forms of treatment, psychological, physical, pharmacological and social. It focuses much of the knowledge of all basic medical and clinical sciences toward the objective of helping or curing a sick person. It is enthusiastically received by medical students.

The merger of Therapeutics with Medicine provides the most desirable alternative to retention of a separate department and can be justified on the basis of long, close association and on the ground that both are primarily clinical subjects with a fundamental orientation to the patient. As long as the present policies and personnel of the Department of Medicine are preserved, the teaching of Therapeutics will continue to receive appropriate emphasis. But a change in personnel and policy might lead to gradual attrition of the Therapeutics component of Medicine in terms of manpower, interest and share of the time-table. It is submitted that this would be an undesirable evolution and would remove a traditional, now almost unique, component of the teaching of this Faculty. It is recommended that the Department of Therapeutics be retained as a separate department to continue its traditional role in undergraduate teaching and that it have subdivisions in all the clinical schools. Its members should continue to hold joint appointments in the Department of Medicine and they may elect to pursue research activities in medicine, or clinical pharmacology, the latter in association with the Clinical Pharmacology division in the clinical schools.

SCHOLARLY ADDRESSES

Professor R. W. Gunton, "Long Term Treatment of Coronary Heart Disease," College of General Practice; "Drug-Induced Illness," Toronto East General Hospital Clinic Day; "Hypertension," "Urinary Tract Infections," "Diuretic Therapy," "Angina Pectoris," British Columbia Medical Association; "Antibiotic Therapy," University of Toronto Alumni Association; "Clinical Toxicity of Antimicrobial Agents," Canadian Society of Chemotherapy; "Beta Adrenergic Blockers: Potential Therapeutic Application," American College of Physicians Post-Graduate Course; "Alpha and Beta Adrenergic Blockers: Potential Therapeutic Application," Academy of Medicine, Section of Anaesthesia; "Recent Advances in Therapeutics," Scarborough General Hospital Clinic Day; "Cardiac Drugs and Antibiotics," Ontario Medical Association, Section on Geriatrics; "Medical and Surgical Treatment of Cardiovascular Disease," Northwest General Hospital Staff.

RESEARCH

Dr. John Spears has completed his clinical evaluation of guanoxan, a catecholamine-depleting agent in the treatment of hypertension. Dr. Spears has also continued his survey of adverse drug reactions on the medical service of the Toronto General Hospital under the sponsorship of the Adverse Drug Reaction Reporting Programme of the Food and Drug Directorate.

Dr. Alan Hebb has conducted a trial of the comparative clinical efficacy of two new, oral diuretics, furosemide and ethacrynic acid, with mercaptomerin given parenterally. He has continued and completed the two double-blind studies of antianginal agents begun last year by Dr. Godwin. The first of these compared pentaerythritol tetranitrate, prenylamine and placebo. The second compared placebo with

propranolol, a new beta-adrenergic blocking agent.

Dr. Mary Robertson has continued her work on urinary tract infections including assessment of the prognosis and treatment of asymptomatic bacteriuria and the value of prophylactic antimicrobial treatment following symptomatic urinary tract infections. This work has been done in co-operation with Dr. F. M. Hill of the Women's College Hospital. Dr. Robertson has also conducted a double-blind trial at the Toronto General Hospital, comparing the efficacy of penicillin alone, penicillin plus tetracycline and penicillin plus ampicillin in the treatment of acute bacterial pneumonia. She has studied the response to treatment of certain acute infections with the new antimicrobial, cephaloridine.

Publications

GODWIN, T. F. and GUNTON, R. W. "Clinical Trial of a New Diuretic, Furosemide: Comparison with Hydrochlorothiazide and Mercaptomerin" (Canadian Medical Association Journal, vol. 93, no. 25, Dec. 18, 1965, pp. 1296-1300).

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Gunton, R. W., Evans, J. R., Baker, R. G., Spears, J. C. and Beanlands, D. S. "Demonstration of Myocardial Infarction by Photoscans of the Heart in Man" (American

Journal of Cardiology, vol. 16, no. 4, Oct., 1965, pp. 482-7).





